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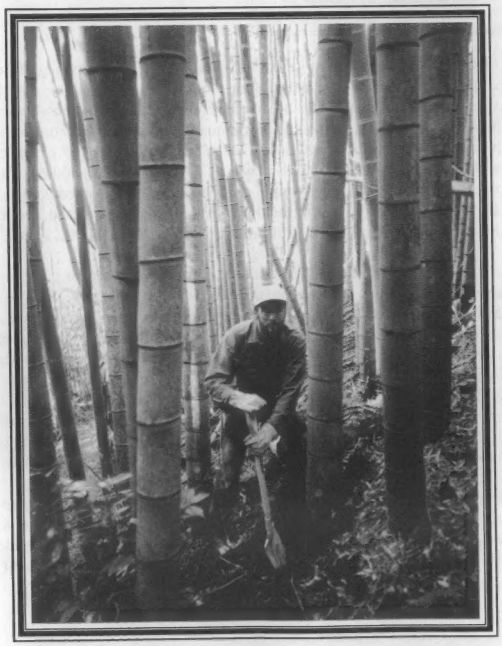
EXPERIMENTAL MUSICAL INSTRUMENTS

For the Design, Construction, and Enjoyment of Unusual Sound Sources

NEW FASHIONED OLD FASHIONED

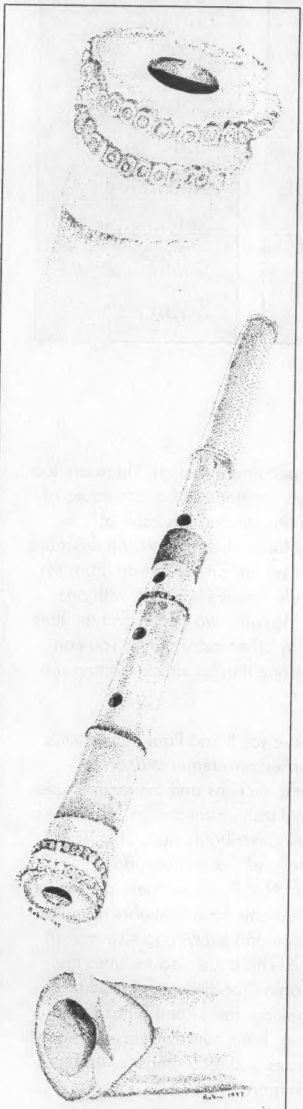
The good, old-fashioned idea of the one-man or one-woman band will never become outdated. There are too many reasons to want to do it all yourself. Niles Hokkanen is one who has been developing the techniques of one-man banditry, and in this issue of *Experimental Musical Instruments*, he describes his percussion set up: an entire trap drum set that he can play, believe it or not, with *one foot alone* ... leaving two hands and another foot free to play other instruments. You can see how he's done it in his article starting on page 31.



Above: *BAMBOO!* See John Neptune's artilce starting on page 13.

Also in this issue you'll find Paul Rubenstein's essay/memoir/lecture-demonstration on electromagnetic pickups and their varied uses in experimental instrument design. We have a report on the indescribably odd, unique and original music, and the equally odd instruments, of Neil Feather. There are lots of bamboo instruments from shakuhachi-maker Monty Levenson and everything-else-maker John Neptune. This issue also includes the latest from Robin Goodfellow on children's instrument making, from Reed Ghazala on circuit-bending, from our reviewers on recently published books and recordings ... and, as always, much more.

So I say welcome; thanks for being with us. Open now, and read.



ASPECTS OF SHAKUHACHI
Drawings by Robin Goodfellow
See the article stating on page 11

RAY WILDING-WHITE'S "Poème électronique: A Building as an Instrument" in the March 1998 *EMI* is an excellent explanation of just what went on musically in the Philips Pavilion. It makes the case perfectly that the building was a musical instrument, not just metaphorically, but in the normal sense of the term.

But, I'm really annoyed to see it perpetuate the myth that it was Le Corbusier who was the designer or architect of the building. Strangely, the article itself attributes the drawings and the model to Iannis Xenakis, who in fact was the architect. I'm sure Le Corbusier had a lot of input into the design, and it is true that what went on inside was mostly his concept.

For setting the matter straight, I recommend especially Chapter 5, "The Philips Pavilion," in Nouritza Matossian's *Xenakis* (London: Kahn & Averill, 1986), a publication that Wilding-White doesn't mention.

Le Corbusier seems to have had a strong ego, which led him to lay claim to anything his disciples created. In the case of the Philips Pavilion, most writers have taken his word for it. It's easy enough to verify who was the architect. Le Corbusier's gone, but Xenakis isn't. Ask him.

I would like also to comment on the note on page 11: "There is, in actual fact, no real mathematics in Xenakis's work." As Xenakis presents his work imbued with mathematics, this statement seems to be intended as a put-down. But as a categorical statement, it is insupportable. In a substantial part of his work, Xenakis set up a design "intuitively," then applied a scheme of probabilities, often through the intermediary of a computer, to determine the actual details of the score.

— Frederick Crane

From the editor: The confusion over Xenakis' role in the Philips Pavilion article is due not to any shortcoming in Ray Wilding-White's writing, but rather to an error that occurred here at *EMI* as the issue was being laid out. We somehow inadvertently dropped an entire paragraph from the article. The missing paragraph is reprinted under "Corrections" on page 8.

A FEW YEARS AGO, I visited a music store in a dream. It was a fascinating store with instruments from all over the world, past and present, and possibly the future, definitely a subconscious musical bazaar or a bizarre musical subconscious. At any rate, I only remember, with any clarity, two instruments, The first being the percussive pillow or the acoustic cushion (as you like it). It was shaped similar to a symmetrically fried egg. The "yolk", or center, like a ball: firm and tight as drum head, and the "white," or fringe, has another tone. The thickness of the outer flat section increased from one side to the other. You could play it flat on your lap, or on its edge. Under your arm, held between your knees, tossed into the air, laying it on the floor. Different tones for the different positions. A nice feel, a good warm sound.

The other one that I remember was rather rustic, kind of thrown together. A plywood circle (or so it seemed) mounted onto (yet overlapping) the larger plywood circle. The larger circle was mounted, somewhat off center, on a large tubular section that served as the resonator. Mounted on the bottom (again off center) of the smaller circle were two rectangular box-like pieces. These box-like pieces served as resonators but also like a reco-reco/slit drum/square boo/thumb piano/rjon combination. Many sounds to choose from there. With my left hand I beat out a rhythm (the instrument was mounted on a stand), varying the tempo with the side of my hand, thumb, palm, etc., while my right hand produced a variety of sounds on the box-like resonators/sound boards, scraping my finger nails for an eerie sound, tapping my knuckles, strumming, tapping, etc., etc. A wide array of sounds and tones that surprisingly blended together really well.

I awoke and jotted down the brief descriptions (and in so doing could not recall the other three to five instruments I played), wondering if they would sound as good in the waking state, and just what materials would be needed to construct them. So far I'm still wondering, not having pursued the endeavor of building them. Perhaps some of your readers might catch a spark. Tell 'em to let me know, or you can.

— David L. Roop
2402 Pennylane SE, Decatur AL 35601

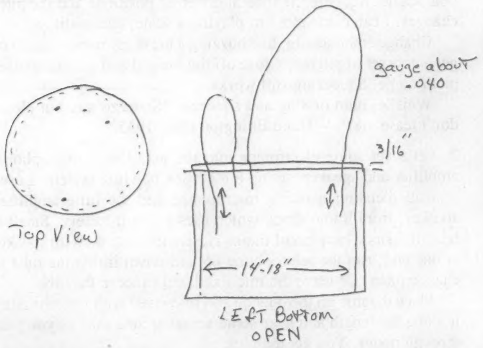
WHILE READING the article in Vol. 13 #1 [*EMI*, Sept. 1997] about "Modular Drums from Plastic Pipe and Plywood" by Ben Cohen, I had to laugh because I was building a couple of drums myself but I used industrial-grade cardboard tubes that measure 14" to 18" in diameter, 3/8 to 5/8 inch thick walls. (Come to think of it, cardboard barrels like the ones used for salt and soap powder, the 30-gallon type, would work also.) I used 3/16" to 1/4" interior hardwood laminated paneling, very stiff, for the drum heads. I also drilled very tiny holes, a few, not many, in pairs of two, about .015-.025, and stuck hardened steel wire through these holes (not music string wire). High tensile strength; breaks if you bend it through an angle of about 130 degrees or more. I didn't bend them but more like looped them. By pulling and pushing one end you could vary the pitch. Different sounds when hitting membrane or wire.

Two things were very important.

#1. Glue one end of wire to plywood membrane to secure it . Cyanoacrilate adhesive works good. #2. The second hole must be rather tight to transfer the vibrations to and from the wire. I ended up using pliers to adjust wire/s. The ends of the wires also send out harmonics versus the loops.

— Bill Mauzey

P.S. I used polyurethane glue to attach the plywood to the cardboard tube; used plenty of weights.



I RECENTLY ACQUIRED a Playskool "Sax-o-fun"... at a thrift store for $1.99 (plus tax). By opening a hole in the back I can "bio-modulate" the electronic sounds by pressing, rubbing, brushing various areas of the sound (?) chip and surrounding resistors and capacitors.

The sounds can either be slow, low to growly and/or very fast, chirpy and somewhat shrill. One can "warp" the pre-set melodies (eight, including my all-time favorite "Twinkle Twinkle Little Stars") as well as make one's own melodies and "warp" them, too, using the "REPLAY" button.

I've called this latest addition to my growing collection of sound/noise toys: TWITTERING MACHINE/Zwitscher-Maschine after both Paul Klee's painting of that same name and Tan Dun's composition inspired by Klee's painting of that same name.

—zHANg

IN THIS ISSUE

EXPERIMENTAL MUSICAL INSTRUMENTS
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SUBMISSIONS: Experimental Musical Instruments welcomes submissions of articles relating to new or unusual musical instruments. A query letter or phone call is suggested before sending articles.

HERE ARE SOME LETTERS TO THE EDITOR in response to a couple of excellent articles in your December issue.

FIRST

The "Talking Machine" is an excellent account of the development of a novel device for producing speech sounds. It also demonstrates the nerve needed by any innovator, namely entering a contract to produce a thing that only exists in the mind. Hats Off! to this remarkable achievement.

Not to deflate, but to educate, I have a remarkable computer which talks and has been able to do that since 1985 when it was introduced to the world.

It is the Amiga, which was mistreated by Commodore (who went bankrupt). The orphan computer was passed through several foster homes and recently landed at Gateway 2000.

My Amiga can read this text as well as any other ASCII file which it encounters. Specially generated text files allow for control of pitch, speed and even gender of the speaker.

A complementary program allows sampled sounds to be injected wherever desired, ranging from bells, whistle, gongs to samples of the spoken word.

My Amiga can, thus, produce a talk show, a family squabble, a game show, a weather report or any other people-type interaction.

The Amiga also sports stereo output which could drive a sound system as big as that of a Rock Band (I hope the Rap guys don't find out about this).

At lesser levels, it can be recorded on audio or video tape or CD.

Any one interested in hearing my Amiga in action can reach me by e-mail:DW1920@aol.com

We can work something out.

Viva l'Amiga !

NEXT....

"Historical Patents" by Cary Clements is a shining example of diligence in unearthing the patent history of the horned violin.

However, I have concluded from experience (about 100 patents issued to me) that the entire patent system is a huge scam. This is not sour grapes. I have made a ton of money from inventions, but not because of patents.

"Experience is learning a lot of stuff I really didn't want to know" and here is a little bit.

Cary quotes Patent Office pamphlet "What is granted is not the right to make, use or sell, but the right to exclude others from making, using or selling the invention." True enough, but read on.

You tell "others" (infringers) to stop and they don't. Then what? You take it to patent court after you hire a patent lawyer. Remember, you have already paid to get that patent.

The trial comes up and you are a little guy suing a big guy and, like elsewhere, money talks. Usually your patent is judged to be invalid meaning that the patent examiner should never have issued it in the first place.

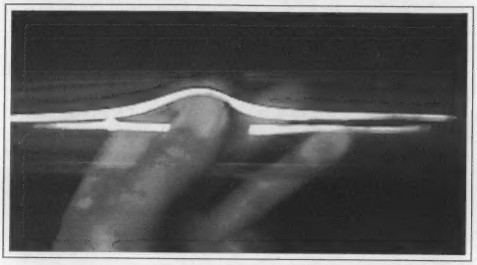
This process nets about ten out of ten patent suits going against the patent holder (the inventor).

Notice the number of Patent People feeding off the inventor, all because he believes that the patent system gives him some kind of protection.

It's a scam!

Please note! The only protection is a fast pair of track shoes. Just do it faster and better than anybody and don't waste a lot of time and money feeding the Patent People.

Clear Polycarbonate Flourescent Lamp Guard — a soft plastic tubing



AND ANOTHER ...

NEWLY DISCOVERED PIPE MATERIAL

In my local hardware store, I just found a Clear Polycarbonate Fluorescent Lamp Guard made by Liteway. Their #74-4812 is four feet long, 1.5 inch diameter and about 0.2 mm wall thickness. Price, about $3.

So what can we do with this stuff ? Lots ! Read on.

1. At full four feet, put your mouth at one end and make a motor boat sound. Squeeze the tube at different positions and the pitch changes. I can come close to playing a scale, chromatic yet.

Change embouchure, like buzzing a brass instrument, and you get a new set of pitches. Close off the far end and get yet another pitch range. Squeezing still works.

Whistle, hum or sing and squeeze. "Squeeze me, but please don't tease me." — Duke Ellington circa 1935.

2. Let's get some electronics into the act. Using microphone, amplifier and speaker, set up a feedback howling system. I used a small dictating machine microphone and the little amplified speaker, from Radio shack which uses a 9-volt battery. Small is beautiful since location of things is easy to control. With speaker at one end, run the microphone up and down inside the tube to change pitch. Or leave the mic fixed and squeeze the tube.

Place the mic on the outside and in contact with the tube. Run it along the length and hear some amazing bird calls as you pass through nodes. You get the idea.

3.Using scissors, cut a 19-inch length and whack it against the edge of a table and hear it sing. Cut a 5-inch length and, holding it lightly, with thumb inside and forefinger outside, whack it and listen to the higher pitched "bonk." I don't know the arithmetic which controls pitch. I'm sure there is some familiar relation. What I did was pure "cut and try." I went back and bought three more.

I am about to sample some of these sounds into my PC as wave files. Anyone wanting a floppy disk of this stuff can e-mail me or write.

AND FINALLY ...

MOTION, MAGNETS and CURRENT

I still recall Physics 101. The Professor discharged a big condenser (before capacitors) into a big coil which immediately jumped six inches off the bench. I think it is because the earth has a magnetic field. It still does, according to the Girl Scout compass I picked up at Goodwill.

Later, in Engineering, I learned that motion of a coil in a

magnetic field will produce a current in the coil. A generator. Or, current in a coil in a magnetic field will produce motion of the coil. A motor.

The same principles apply to loudspeakers and dynamic microphones. The best microphone in my arsenal is a two-inch Radio Shack speaker mounted on a piece of plywood with a 1/4 inch audio receptacle, all held together with plumbers epoxy, the kind that comes in a two color stick which you massage until it becomes an intermediate color. Handy stuff.

I have also used a pair of headphones as a stereo microphone.

All of this leads up to describing a single string, fretless bass fiddle with 1 ohm output resistance. No hum pickup even with super long cables.

It starts with a square aluminum tube,1 inch square and six feet long. The tube serves as electrical ground in a circuit which includes the metal guitar string.

The tube houses a string of six bar magnets extending over the full standard playing length of the guitar. The plucked string provides the motion in the magnetic field which then generates a current in the string. The resulting current is then fed to the input of an amplifier of any impedance. The generated signal is about the same level as that produced by a dynamic microphone. Output depends on the strength and number of permanent magnets used.

I like to think of this as a "no turn coil" pickup.

This prototype includes the usual bridge, nut and standard tuning gadget.

The aluminum tube is the finger board. Since there are no usual pickups in the way, the bass is playable over four octaves.

Other instruments are in the works including four- and six-string guitars, starting with commercial acoustic and electric instruments.

In the planning stage is a stringed xylophonesque thing which uses one length of piano wire, wound back and forth between pegs of decreasing spacing, and winding up at a single tuning gadget. If I do it right, the whole thing can be tuned at the twist of a wrist.

Motion can be launched by the pluck or the mallet.

I expect to use a separate zig zag for the black keys.

Under construction are other guitaresque things with the standard number of strings, but novel appearance. I just bought a door jam and a toilet seat.

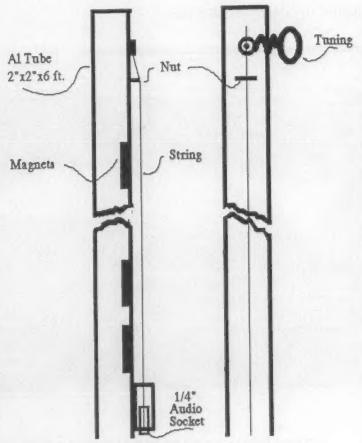
You get the idea.

Any questions ?

— *Dwin R. Craig*, 6971 Rooks Ct.#103, Frederick MD 21703; e-mail DW1920@aol.com

FRETLESS SINGLE-STRING
ELECTRIC BASS
with 1-ohm Output via 1/4" Socket

Uses aluminum tube which encloses a row of permanent magnets. Current is induced in plucked string whose signal is fed to output socket.



Dwin R. Craig

NOTES FROM HERE AND THERE

MUGWUMPS RETURNS

Back in the 1970s, there was a periodical called *Mugwumps Instrument Herald*, published and edited by Michael Holmes. *Mugwumps* was devoted to folk music instruments of all sorts, including ukelins, glass harmonicas, various sorts of reinvented zithers, along with the usual mandolins and banjos. *Mugwumps* has been out of publication for many years now, but Michael Holmes is now making noises about reviving it, and also re-releasing some of the best articles from the early days. It all starts with a web site. You can get more information by visiting it at http://www.mugwumps.com.

"CHEMICAL GIANT DUPONT BUYS MINORITY INTEREST IN REMO, INC. $45 Billion Multinational Views Percussion as 'Promising Opportunity.'"

That's a headline from an article in *The Music Trades Magazine* for March 1998. The article goes on to describe how the Remo company, manufacturer of drums and percussion, was the first to develop drumheads of mylar, and has long had a relationship with Dupont as a supplier of the material. Is it possible that Remo — noted for its interest in ethnic-looking drum forms, its advertising oriented to new-age markets, and its interest in music therapy — could humanize the corporate behemoth?

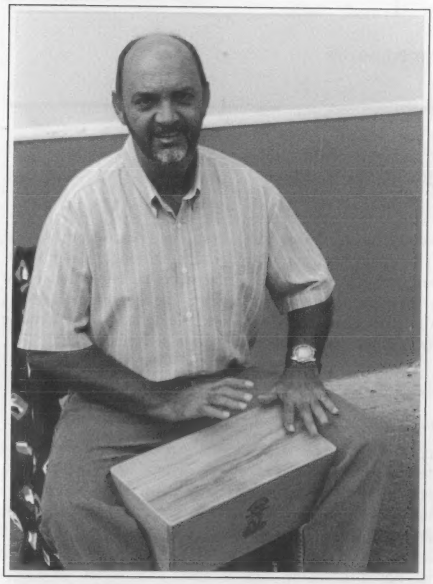
BEFORE YOU SEND YOUR LATEST RECORDING TO EMI FOR REVIEW...

Here at *Experimental Musical Instruments*, we are notoriously terrible about printing CD and cassette reviews in a timely fashion, and we always have a large backlog of deserving recordings awaiting review. With just four issues remaining before the magazine ceases publication, we're at a stage now where we'll have a hard time getting to all that we'd like to review before the closing. For that reason, *EMI* is now, with regret, no longer

welcoming new material for review. ...Well, OK, if it's really important, you can still send it to us, and we'll be happy to see and hear what you're up to creatively. But be aware the hoped-for review very likely will not come to pass.

To all who have sent us cassettes and CDs in the past, many thanks. While it has often been hard to keep up, and while we haven't been able to review much of what comes in, it has been a great pleasure to the editor and the reviewers to hear so much creative work in the field of unusual musical instruments.

Wooden Bongo played by its maker, Pedro Barriera



PUERTO RICAN PERCUSSIONIST Pedro Barriera has created an all-wood bongo with a remarkably clear and unmistakably bongo-like sound. Here's his description of the instrument:

Barriera's Wooden Bongo

This instrument, of my own creation, was designed and first crafted about three years ago. It is more convenient than the traditional bongo, doesn't need the rawhide "cuero" or leather, and doesn't require the tuning screws. Also, it's a lot lighter. The sound never changes or gets damaged, no matter how the temperature changes. The sound is almost like the traditional bongo, sometimes even better.

For the past twenty-five years, I have been playing music of all varieties: salsa, Latin, jazz, folkloric music, and my music experience has been my influence to develop this instrument.

At the present time, this bongo is my primary instrument when playing live in presentations or concerts. There are many percussionists who are now using it also. They really like the sound.

If interested in buying, send a money order of the U.S. Postal Office for the amount of $130.00. It includes shipping and handling.

Pedro Barriera
PO Box 1341, Ponce, Puerto Rico 00733-1341

WILL SOMETHING ELSE PICK UP WHERE *EMI* LEAVES OFF?

A note from *EMI*'s editor

As we announced a couple of issues ago, *Experimental Musical Instruments* will publish its last issue in June 1999. Many people have asked whether, following that, something new might arise to take *EMI*'s place. Is it possible that another person, or perhaps a group of people, could take over when the current editor and publisher steps aside? Would some sort of internet publishing — easier and less expensive than print publishing — be a good idea? Would a network or membership organization for creative instrument makers be practical?

The answer to these questions depends on whether anyone comes forward to do the work. And if there are people who would like to put effort into such an effort, then it will be valuable to have communication between those people, thus averting duplication of effort and perhaps promoting teamwork. The most logical center for such communication would be here at *EMI*. So, let me invite anyone who might want an active role in producing a *Son of EMI* to be in touch with me. I'll keep track of any who express an interest and, where suitable, I'll put them in touch with one another.

And for any who might be thinking along those lines, I want to mention a couple of considerations.

First let me say that, even after we stop publishing the magazine, *Experimental Musical Instruments* will continue as an active entity, engaging in a variety of instrument-related projects

ROBERTA BERMAN QUINN is an educator at Bank Street College in New York teaching sculpture to children ages six to fourteen, and teaching educators, administrators and artists how and why to teach sculpture to children. A major portion of her curriculum is instrument-making.

Her classroom is a wood shop, with a full supply of sculpting and carpentry tools, so she has the luxury of being able to have students work with wood. They create xylophones, drums, chordophones, idiophones and mbiras.

Roberta's own work is a synthesis of figurative sculpture and ancient-style musical instruments — primarily slit drums, mbiras, ocarinas and xylophones. One of her primary intents is to see and to hear how different music is spontaneously elicited from each individual, and how the sculpture, in relation to each person playing it, becomes a different sculpture.

Roberta recently sent the images and text below representing her piece *JamSession, homage to Marisol*.

JamSession, hommage to Marisol is the title for this work which synthesizes sight and sound. Experiencing Marisol's multi-dimensional compositions has deeply inspired and encouraged my own synthesis of materials and expressive techniques. Individually each sculpture has its own voice and its own story, and collectively they are a chorus having an inner dialogue.

Recently I realized that what often surprises people about my instruments is that they are made primarily of pine. Inspite of pine being a soft wood, a wide range of beautiful and evocative notes can be created. Pine is wonderfully available, affordable and malleable. The flexibility of the material allows me to work in my own style--pre-meditative and spontaneous, figurative and abstract--which involves transforming the architecture of the instrument into a "canvas" into which I draw with ink, chisels, planes and files, the sandbelt and the drill.

Roberta Berman Quinn
301 West 108th Street
NYC 10025

High-heeled Blues
36"x16"x8"
wood, ink, metal
1997
Musically: A slit-drum hip and a chordophone leg and mallets, to be played by one or two people.

Requiem
15"x56"x8"
wood, ink
1996
Musically: A slit-drum, to be played by one or two people.

Untitled Slitdrum
24"x8"x7"
wood, ink
1997
Musically: Two slitdrums--on opposite sides, to be played by one or two people.

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and continuing to make available for purchase our various books, back issues, tapes and such. For that reason, the *EMI* name won't be transferred to a new entity. It'll stay here, and whatever else may come along will need a name of it's own (a situation which will probably be preferable to all concerned anyway). At the same time, I will be happy to do what I can to help create a line of continuity between the existing *EMI* magazine and whatever might follow.

Many people prefer a print journal to an online journal, and of course not everyone is hooked up to the online world. But the relative ease and inexpense of online publishing do make it an attractive alternative. In light of this, I will mention two online forums already in existence which deal with musical instruments. Whether or not anything else arises to follow the *EMI* magazine, these forums can serve as valuable meeting places for people with an interest in experimental instruments. One is the Oddmus mailing list, which operates under the guidance of Dr. Guy Grant. It is an informal, friendly place devoted to open dialog in the form of email messages relating to interesting and unusual instruments of all sorts. To get on the list, go to http://www.coollist.com/. The other is the Musician's and Instrument Maker's Forum (MIMF), operated by Debbie Suran. It too is devoted primarily to friendly and informative email exchange, but it differs from Oddmus in that it's a larger operation, with a wider variety of features, more elaborate organization and more active management. In addition, while Oddmus specializes in oddities, MIMF is open to all sorts of instruments, conventional and unconventional.

I'll be happy to discuss these and related issues with anyone who takes an active interest. You reach me here at *EMI* (contact numbers appear elsewhere in this letters section.)

Bart Hopkin
Editor

EMI SPONSORS MIMF

Experimental Musical Instruments has become a sponsor of the *Musicians and Instrument Makers Forum*, an interactive forum devoted to musical instruments on the World Wide Web. Within the forum are sections devoted to all the major instrument groupings, and one as well devoted to experimental instruments, plus a variety of other instrument-related topics. I have found this forum to be well organized, easy to use, and enjoyable. Look for it at www.mimf.com.

CORRECTIONS

An entire paragraph was inadvertently omitted from Ray Wilding-White's article "Poème Électronique: A Building as an Instrument" in *EMI*'s March 1998 issue [Vol 13 #3]. The article describes the creation of the Philips Pavilion at the World's Fair in Brussels in 1958. *EMI* apologizes to Ray Wilding-White and to all the readers who, without knowing it, got an incomplete reading of the article. The paragraph should have read as follows:

In 1956, Philips hired the internationally famous architect Le Corbusier to design the pavilion. Le Corbusier was given to conceiving grand, sweeping designs and then leaving the nuts and bolts to an assistant; so he hired Iannis Xenakis as an architectural assistant and draftsman. (Most of the drawings in this article were by Xenakis.) Both men had substantial egos and clashes occurred; further, Philips's top management was leery, as CEOs are wont to be, of this unconventional plan. It was largely due to the extraordinary tact and patience of L. C. Kalff that the project was completed.

WEB SITES OF INTEREST

Following is a short list of sites on the World Wide Web relating to unusual musical instruments that have come to *EMI*'s attention lately. Many more are listed in previous issues of *EMI*.

Mugwumps, journal (not currently publishing) devoted to folk instruments (mostly American); good links page:
http://www.mugwumps.com

Information relating to one-person band equipment:
http://people.delphi.com/johnpollock/index.html

Newband, new instruments performing group and conservators of the original Harry Partch instrument collection:
http://www.purchase.edu/newband

Walter Smetak, the now-deceased Brazilian maker of invented instruments (text in Portuguese):
http://www.gilbertogil.com.br/smetak/taktak1.htm

Johannes Bergmark, surrealist instrument inventor:
http://www.flashback.net/~bergmark

K&K Sound Systems, makers of the affordable contact microphones that seem to be most beloved among experimental instrument makers: http://www.kksound.com

The Robot Store, source for hard-to-find robotics components:
http://www.robotstore.com

Access to a several recent articles in *Wired Magazine* dealing with instrument explorations:
http://www.wired.com/news/news/culture/story/9546.html

Bakshish, performing duo that makes extensive use of homemade and invented instruments: http://www.bakshish.org

Distributor of didjeridus, aboriginal-owned and operated:
http://www.didj.com.au

Lithophones (stone chimes) in Iceland:
http://www.itn.is/~edavid/ton/englitho.html

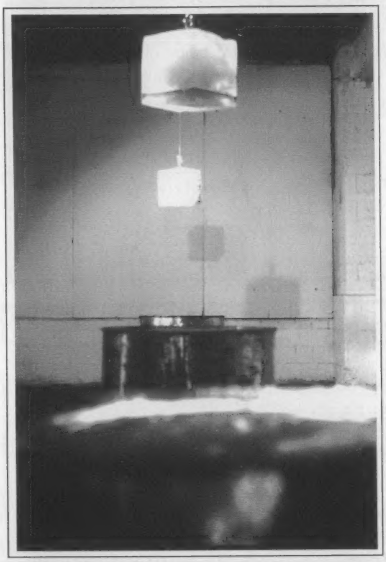
IF ALL GOES ACCORDING TO SCHEDULE, San Francisco sound sculptor James Harbison will be constructing a "Wall of Clang" this April and May on the state line between Nevada and Utah, due south of the town of Wendover. The installation will consist of a fence, eight feet high and thirty-five feet long, serving as an armature for rattles and bells fashioned from scraps salvaged in the surrounding area. "What I am envisioning," James says, "is a wall of sound that will divide the empty landscape along the arbitrary state border — Utah to the east, Nevada to the west. While the wall wouldn't be a visual barricade, it will be a dense lattice work of noise-makers and this thirty-five feet may exist as the only physical obstacle to passage from Nevada to Utah, Utah to Nevada in the immediate expanse."

The project is supported by a grant from the Center for Land Interpretation, who in turn are funded in part by the National Endowment for the Arts. To learn more about the project you can contact James at 110 Capp St. #4, San Francisco, CA 94110; (415) 552-7745; skinny@fatnet.net, or go the Center for Land Use web site at http://loft-gw.zone.org/.

Aside from the Wall of Clang, what other sorts of sound works has James Harbison made? At our request, he sends along these photographs and notes, beginning with his description of ...

ICE DRUMS

The ceiling of my old studio is laced with leaky pipes. I had taken to placing buckets and a damaged frying pan at strategic points on the floor in order to catch all the spilled water. Initially,

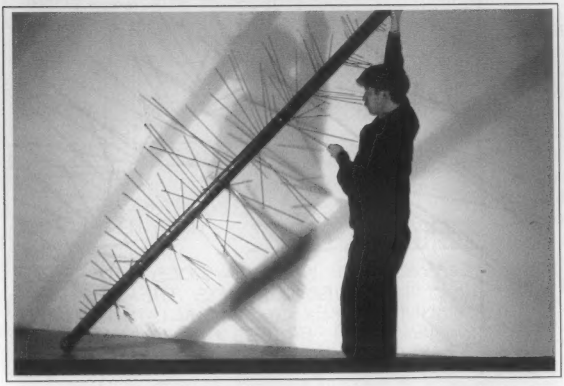


SOUND SCULPTURES BY JAMES HARBISON

Above left and right: Ice drums

Below left: Rainsticks

Below right: Swing Flowers



I wasn't aware that I had begun to make music out of the action of dripping water or that the whole room where I worked could be a musical instrument to be played. During breaks from work, resting at my desk, I came to realize the quiet euphony. My first application of this new fascination was to make little drums by stretching latex to serve as skin over the cylinders of open-ended tin cans. I microphoned these can drums and positioned them under melting, hanging ice. Ever since then I've been involved with filling space with sound.

I wanted to increase the scale and keep to the thematic idea of metamorphosing former ordinary containers into musical devices. So, I gathered oil drums and set to work on calypso pans. Adding ingredients to the water to be frozen, like nails and small hardware, enabled the water as ice to suspend the ingredients, then deliver the ingredients as it thaws. I set the pans directly under the striking liquid and falling nails in safe places like stairwells.

These installations emphasize the unnaturalness of water indoors or ice in the heat. They are spatial variations of a basic and direct vertical relationship of higher-altitude water, falling to meet a drum at lower elevation. Visually, it is a dialogue between solids: a block of ice and a cylinder. Acoustically, this interaction of diminishing solids yields percussion. Percussion due to simulated rain transforms interior space. Ice is transformed into sound. Tin cans and garbage barrels are cinderellaed into cellos, basses and guitars.

SWING FLOWERS

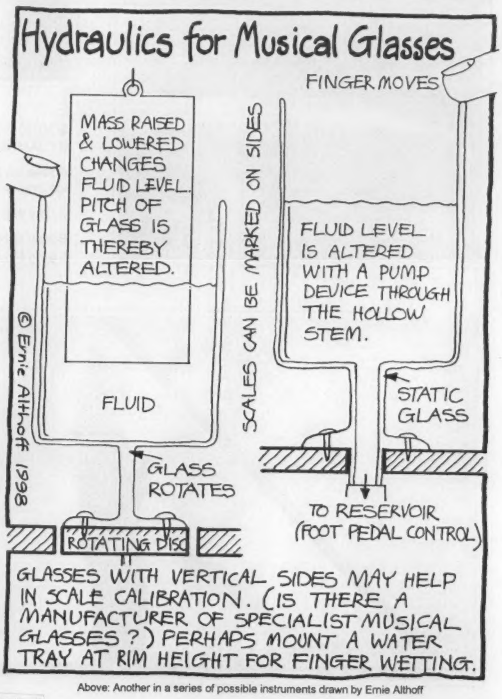
Swing Flowers was so big and lethal it took over my tiny room. I banished it to the fire escape, one cold winter morning. At that time I was still living in New York. Returning from work, I went to retrieve it and found that it had changed pitch.

The Swing Flowers sculpture consisted of upright steel wires weighted at the tops. Capriciously wobbling in any wind, the wires crashed into one another with an echoing, popping sound. At room temperature, the confrontation of unsteady wires had produced a lower pop. The chilled steel popped now brisker. Swaying in conical motion, anchored to a sloping base, my enhanced wires looked like a patch of industrial sunflowers off a hillside. By running my hands over the metal tops, I could play the piece. While fun, it was a dangerous interaction, since the wire columns were over-stressed with load, doubling and bouncing in spring tension; unexpectedly, they tended to swoop.

TWELVE RAINSTICKS

To make these spiny metallic sound sticks, I drilled holes in assorted lengths and diameters of pipe and plugged the holes with steel rod. Each rod passes from the outside through a hole, so that its end reaches almost to the opposite inside wall of pipe. After filling each cylinder pipe with buckshot or pennies, I capped the ends. They produce colder, higher sounds than the wooden rainsticks I have seen. My longest stick stretches ten feet and needs the coordinated effort of two people to play it. A short one is two feet in length. Both have rods which come out from the main tube at different, varied lengths. If you pick one up to play it, then when you lay it down it will likely rest on a different combination of rods. This is a way to make a relatively simple form, visually rich, complex and changing. After each handling, it will appear as a different object. With their rods projecting from the center trunk, even as they are instruments, my rainsticks inhibit causal play. You have to be mindful or you will impale yourself.

When I show these twelve rainsticks in the future, I'd like to set them up initially in a pile on the exhibit floor, like that antiquated game, pick-up sticks. People would be encouraged to pick up the sticks, shake 'em and dispose of them anywhere in the gallery space. In this way, twelve rainsticks would be an interactive installation where the art had no specific assigned place.



Above: Another in a series of possible instruments drawn by Ernie Althoff

In the following two-part presentation, *Experimental Musical Instruments* introduces John Kaizan Neptune, player of the shakuhachi flute and explorer of the sound-world of bamboo. The first article, by Monty Levenson of Tai Hei Shakuhachi, discusses John's work with shakuhachi, including shakuhachi making, performance, and traditional culture. Monty also speaks of his own work, in collaboration with John Neptune and others, in developing special technology to bring consistently high results at affordable cost to an instrument known for the elusiveness of its most desired qualities. In the second article, John Neptune himself discusses his wonderfully inventive forays into the creation of an all-bamboo ensemble including drums, percussion aerophone, free-bar instruments and winds.

JOHN KAIZAN NEPTUNE & SHAKUHACHI INNOVATION

by Monty H. Levenson

I have known John Kaizan Neptune for close to twenty-five years, during which time we have collaborated on research and innovations related to shakuhachi, the traditional Japanese bamboo flute. John's impetus to begin making shakuhachi came as he was evolving as a player and could not find an instrument to satisfy his very high standards. While he has continued to craft flutes for many years, John is best known in Japan as virtuoso performer and a talented composer of modern shakuhachi music. His fusion of traditional Japanese and American jazz motifs has become a genre unto itself. Lesser known in the States, John's work in Japan has received the highest accolades and he is regarded amongst the most esteemed living masters of the shakuhachi. This is truly a remarkable accomplishment for a foreigner living in the homogeneous culture of traditional Japan.

Originally from San Diego, California, John Neptune has been residing in Japan since 1976 where he immigrated to pursue the study of shakuhachi after earning a degree in ethnomusicology at the University of Hawaii. Within five years, he achieved the rank of master *(shi-han)* from Tozan School of Shakuhachi. At that time, he was given the honorific name *Kaizan* which means "Sea Mountain." Author of the only English-language playing guide for *Tozan-ryu* notation, John has produced over twenty albums of shakuhachi music comprised largely of his original compositions. John's concerts — over a hundred a year worldwide — often include interesting commentary about shakuhachi and Japanese music prior to each piece performed, teaching his audiences much about the beauty and subtlety of Japan's fading traditional culture. Having attended a number of his performances in Japan, I have been impressed with how his open and personable approach enables him to connect heart-to-heart with members of the audience.

Shakuhachi maker Monty Levenson

My collaboration with John Neptune began soon after I established a bamboo flute workshop 1970. This was a very special time during which I embarked upon a process that culminated in the development of the precision cast bore technology for making shakuhachi. During much of the Seventies, John and I carried on a correspondence in which we discussed seminal issues in the world of shakuhachi, and, finally in 1984, had a chance to meet when he brought his band to the small town of Willits as part of their multi-city tour of America.

My own work with shakuhachi soon became a full-time albeit frustrating endeavor. After years of producing hundreds of simple, rather primitive, flutes, I realized that it was necessary to follow the lead of makers in Japan and fabricate a precision bore inside the bamboo. This task was essential in achieving acoustical qualities of resonance and timbre that would enable players to do more than struggle with their instruments. The bore of the shakuhachi is configured in the form of two inverted cones, one long and the other short, both of which are painstakingly worked by traditional

craftsmen who hone the interior of their instruments to machinist tolerances. The method employed for generations in Japan is to build up the inside walls of the bamboo root which a material called *ji*, a mixture of tile grout *(tonoko)* and Plaster of Paris. Once this compound hardens, it can be shaped and measured to replicate the interior dimensions of an existing shakuhachi flute which, by virtue of its natural bore shape, has been found to approach an ideal tonal quality that many shakuhachi players seek. The goal of the maker is to replicate, with ultimate precision, the bore of this gauge flute. In the final stages of this slow, meticulous process, the inside of the instrument is coated with several layers of *urushi*, a lacquer which dries to an incredibly hard, mirror finish. *Urushi* is processed from a plant akin to poison oak, occasionally sending players of new instruments to the hospital for cortisone treatments as the lacquer remains volatile for months.

Before the maker begins to think about bore design and fabrication, he faces the formidable task of assembling the raw materials necessary to create a quality instrument. The bamboo traditionally used for shakuhachi is called *madaké* (*phyllostachys bambusoises Sieb. et Zucc.*), which represents about 20% of the total resource for bamboo in Japan. *Madaké* is a giant timber bamboo most abundant in fertile regions and along riparian right of ways. Smaller diameter, denser bamboos suitable for shakuhachi are found only in mountainous regions where the soil is poor and conditions for growth are harsh. While *madaké* is one of the fastest growing plants on Earth — having been measured at over four feet of growth in one day! It can literally be observed growing, like the minute hand of a large clock — quality bamboo for flute making is very difficult to find. Exacting specifications demanded by the traditional aesthetic, which considers size, shape, color, root structure and nodal configuration, combine to make the search for shakuhachi bamboo a daunting experience. A large grove of *madaké* often provides the maker with only a few usable pieces of marginal quality. Japan's high population density, rampant development and economic organization of traditional craftworks further compound the problem of accessibility. Acquisition of bamboo for shakuhachi is further limited by the fact that harvesting occurs only during winter months before the sap has risen in the plant. After a successful harvest, the green bamboo roots must be carefully manicured and heated over a charcoal fire to remove the resin *(aburanuki)*. The bamboo roots must be cured for years before they are dry and hard enough to be fashioned into a flute. During this curing period, many pieces will crack and are rendered useless. All of these factors involved in locating and harvesting the raw material along with challenges implicit in the craft of shakuhachi combine to make high quality traditional instruments extremely expensive and difficult to find.

The initial aim of the precision cast bore technology had been to provide decent sounding, finely tuned instruments at an affordable price for folks who were interested in starting out on the shakuhachi. The spiraling cost of imported flutes during the 1970s and '80s, along with their propensity to split in the diverse climates of North America, discouraged music stores from stocking shakuhachi and people from trying them out. For many years, the standard for beginning students of the traditional music here and in Japan had been a simulated lathe-turned wooden shakuhachi made with an unrefined bore. The first cast bore shakuhachi were made during the Winter of 1987. Little did I know that within a few years these instruments would not only replace the wooden variety, but be chosen by traditional teachers and professional shakuhachi players around the world as their own personal instruments.

None of this would have occurred without the help of John Neptune. Within a month of sending to him prototypes of some early experimental models, John surprised me by showed up at my doorstep to check out my workshop firsthand. Our collaboration began at this time with John not only sharing his groundbreaking research into resonance enhancement, but leaving me several of his best personal instruments to measure while he went off on a performance tour of America. This was typical of his incredibly open and generous nature. Upon his return to California some weeks later, we descended upon the workshop of renown Baroque flute maker, Rod Cameron, using his innovate electronic bore measurer to map out the parameters of John's other flutes. These measurements became the basis upon which I have built many of my more successful cast bore instruments. From Rod's shop in Mendocino, it was a dash to the airport to catch a flight back to Japan. This was a scene that was to repeat itself many times over the ensuing years and the first of our many all-night intensive and bleary-eyed excursions into that mysterious dark tunnel of shakuhachi bores.

Progress continues as the list of projects expands. Many of these incorporate a synthesis of hi-tech elements cannibalized from post-industrial processes melded with more traditional approaches to woodwind design and mechanics. Creation of a laser tracking lathe and computer interface for an electronic bore measurer provides the foundation upon which future innovations are made possible. Mathematical scaling of bore profiles to create long instruments *(chokan)* based on classical sized flutes — common with other woodwinds, but never before attempted with shakuhachi — has met with remarkable success. Research into the harmonic structure of sound waves produced by the shakuhachi via spectrum analysis, redesign of the instrument's mouthpiece and other improvements to enhance the performance of this traditional instrument are just a few to the directions in which John and I are headed. My work with shakuhachi has become increasingly collaborative, involving a small community of very creative individuals who deserve the bulk of the credit for any successes we happen to stumble upon. My personal reward is the privilege to serve an apprenticeship in this larger innovative enterprise.

Efforts over the last few years to harvest a large supply of high-quality madaké bamboo has led me to mountains of Sichuan Province in China and, more recently, to remote regions of the Japanese countryside in search of this elusive resource. (Both John and I seem to prefer crawling around the mountains of Japan in mid-winter to hanging out in Tokyo.) Next on our list is a project to create a shakuhachi that is impervious to splitting and cracking. This involves building a vacuum pumping device designed to stabilize bamboo by sucking a variant of PEG (polyethelenglycol) right up through the root and fibers of the plant itself. Stay tuned.

ACCESS

More information on John Kaizan Neptune can be found on his web site at http://www.pacific.net/~jneptune. E-mail: jneptune~gol.com.

Tai Hei Shakuhachi's web site can be located at http://www.shakuhachi.com. E-mail: monty@shakuhachi.com

TAKÉ DAKÉ

By John Kaizan Neptune

TakéDaké, John Neptune's six-member group, plays instruments of bamboo

The versatility of bamboo is "bamboggling." It would be possible to sit in a bamboo chair, in a bamboo house, and eat bamboo shoots, cooked over bamboo charcoal, eaten from a bamboo plate with bamboo chopsticks, while listening to music made by bamboo instruments from a record player with a bamboo needle, in a room illuminated with a bamboo filament light bulb, powered with energy from bamboo diesel fuels. There are thousands of ways that bamboo has been utilized, and there are new applications being developed for this renewable resource.

Basically hollow, bamboo has naturally been used to make many different kinds of flutes. In addition, an amazing variety of pitched and unpitched percussion instruments, as well as bamboo stringed instruments and jaws harps, are found in the music of many cultures.

I have been playing shakuhachi since 1971 and making the instrument from 1980 to the present. Harvesting the bamboo — digging it up (the root portion is used) — curing and drying it for about two years, inlaying the mouthpiece, drilling the holes, shaping the bore, and finally lacquering the inside is a demanding process, but one that is interesting and rewarding.

Over the years I have used the shakuhachi in combination with musicians and instruments from many different cultures. There are a few traditional bamboo-instrument ensembles, such as the wonderful *jegog* of Bali, and I had thought that I would like to compose some music for shakuhachi and other exclusively bamboo instruments.

In June of 1995, I was invited to perform at a festival in conjunction with the Fourth International Bamboo Congress held in Ubud, Bali. At that time I had the opportunity to see not only *jegog* but many other all-bamboo ensembles. There were a variety of extraordinary bamboo sounds coming from great musicians. But I found that while the shakuhachi could fit into many musical settings due to its flexible pitch and sound, it was difficult to find other instruments with the adaptability and range to play the kind of new material I was hoping to create.

Loaded with raw bamboo rather than completed instruments, I returned to Japan from Bali with ideas for instruments that I would make myself. As I began to explore various sound-producing possibilities, I had two basic concepts that were guiding my work: first, the instruments could include material other than bamboo as part of the frame or support for the instrument, but the vibrating surface had to be bamboo. A bamboo drum with an animal skin head would not be appropriate, but bamboo tubes held together with a wood or metal frame would be fine. Second, the musicians I work with would all be professional with fantastic facility on the instruments they have spent many years mastering. To take advantage of this I have tried to create bamboo instruments that were physically close to the instruments they normally play. For example the baliphone is a bamboo "marimba" with a size and design similar enough to a normal vibraphone or marimba so that Hitoshi Hamada can use his great four-mallet technique.

After working late into the night for many months on one failure after another, I finally began to see results with help from experts in many different fields. A bamboo basket weaver helped me to make woven bamboo heads for the drum kit and a carpenter helped me to plane bamboo smooth and flat enough to make laminated heads for the bass and snare drums. Saito Instruments made a metal frame for the baliphone, and I found a company milling bamboo into thin flat strips which I could use for "conga" drum bodies and heads. The Fuji Bamboo Garden introduced me to a bamboo charcoal maker (for wind chime material) and also showed me where to get the largest bamboo in Japan. A bamboo paper craftsman made many large sheets for two frame drums and a cabinet maker helped me to make and design a large stand for the bambass. My former experience in surfboard making also became very useful when I found that I could bind the bamboo with epoxy-fiberglass to prevent cracking.

The six-member group I formed to play the bamboo instruments is called TakéDaké, meaning "bamboo bamboo" or "bamboo only". Our first performance was in March, 1996 and our first CD called "Asian Roots" was released by Nippon Columbia (Denon COCY-80766) on Jan. 21, 1998.

NOTES ON SOME OF THE INSTRUMENTS

Baliphone

This is a standard chromatic 3-octave (F-F') "marimba" design. The bars are made from tropical Bali bamboo. Japanese bamboo did not resonate very well when made into bars, though I tried three different types. However, the resonating tubes are made from Japanese bamboo.

Bambass

I had some *ka'eke'eke* (bamboo stamping tubes) from Hawaii that sounded great when the closed end was struck on a grass surface. I thought if I arranged a chromatic set on a stand and

struck the closed end with a soft rubber mallet, I could get a good bass sound. Not only was the sound muted, but all the tubes in the frame I made resonated at the same time. So I turned the bamboo around and had better success striking the open end with a sponge-covered bamboo mallet. The longest tube is 2.6 meters and the range is two and one half octaves (C1 - G). Though I am working with some methods to prevent the bamboo from cracking, binding the bamboo at intervals with epoxy-fiberglass seems to prevent any cracks that develop from opening up.

Bamboo Drum Kit

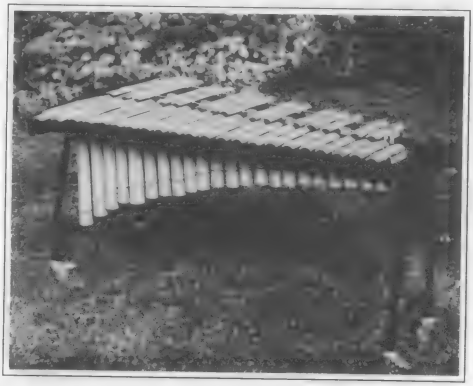
I use two different types of drum heads: woven mat (basket weave) bamboo, and a hard head with bamboo strips laminated together. I use the smooth hard laminated head for the bass drum and "snare" drum. (Using bamboo "brushes" doesn't work well with a woven mat surface!) For the bass drum I first tried using only bamboo laminated together then planed to about 3 mm thick. The bamboo (not the lamination) cracked during the first rehearsal, so I put one layer of fiberglass on the inside which worked well. The "cymbal" is also laminated bamboo reinforced with fiberglass. We sometimes use the option of stringing some bamboo "beads" across the surface to give a bit of buzz sustain. The sound of the bass drum is excellent. The "high hat", "cymbal" and "snare" seem to work best with a composite stick (sometimes called "blast stick") of small pieces of bamboo 3 mm diameter bound together. The woven mat tom toms, however, sound best with a mallet type stick. The different drum sticks make a huge difference in the over-all sound.

Tube Congas

These have a laminated bamboo head with fiberglass backing and a definite pitch. I tuned them D, G, and A. Unfortunately, in the photo you can't see the tuning holes opened on the back side. Struck with the hand or a soft mallet, the tone is quite similar to the bambass. I hope to make a complete chromatic bass instrument using this covered-head idea, rather than striking the open hole. Compared to the bambass, this sort of instrument would allow delicate rolls, the option of using the hands or mallets and the ability

Above: Bamboo-paper frame drums. Diameter 40 cm and 30 cm.

Below: Bambass — hollowed out but with the end left closed; struck at the open end with a sponge mallet. Longest tube 2.6 meters.



Above: Baliphone. The tuned bamboo planks are made of Balinese bamboo and the resonating tubes are madake bamboo from Japan.

Below: Small Bamboo congas.

Left: Large bamboo congas.

Right: The first uduboo has one hole on top for a deep bass tone, while the two heads at the ends of the *T* give a high pitch.

Below: John Neptune working on an uduboo, with laminated bamboo on one end and the natural node membrane on the other. The finished product will look considerably more refined.

to move the tubes closer together for greater speed and accuracy.

Congas

These bamboo laminated-head instruments don't have all the high overtones and sustain of standard conga, but the low-end sound, especially on the 78-cm-tall conga is deep and full.

Bamboo Frame Drums

The heads are made of bamboo paper from the pulp of two different kinds of Japanese bamboo. Bamboo paper is not common in Japan, but there are a couple of craftsman who still produce beautiful paper. I commissioned a frame drum maker who specializes in paper heads to treat this bamboo paper for me. He carefully avoided telling me anything about the process he uses, but I have had good luck treating the paper with white wood glue.

Bamboo Charcoal Wind Chime

The process for making bamboo charcoal is similar to making wood charcoal. Some of the bamboo becomes very ceramic-like and, when crushed into potato chip size pieces and attached to fishing line, make a beautiful high, tinkling sound.

Uduboo

I like the deep bass tone of the African clay pot *(udu)* and the clay pot from India *(ghatarn)*. The first instrument I made with this idea is a long piece (102 cm) of 12 cm diameter bamboo attached to a shorter cross piece (38 cm) to form a *T* shape. Played standing up, the hole at the top gives the deep bass tone and the ends of the shorter piece are covered with laminated bamboo for a high pitched ring. Later I got some of the largest bamboo in Japan and was able to make a smaller instrument played on the lap. It has two holes of different size for different bass tones, and I left the natural node (3 mm thick!) on one side and used laminated bamboo on the other. I have tried many variations: cutting the bamboo in the middle to leave both ends with the natural node membrane, both ends using laminated bamboo, different size holes, etc.

Shakers, Guiro, Bull Roar

Pretty straight-forward and easy to make. I'm using a variety of materials to put inside the bamboo for different shaker sounds: rice, popcorn seeds, small red beans, soy beans, plastic beads, buck-shot, small pieces of bamboo, etc.

Shakuhachi

Over the years, I have made a few unusual shakuhachi. Instead of the standard five-holed flute, I've made a seven-holed major-scale shakuhachi and ones with other tunings. Additional ideas I've explored: a slide shakuhachi (with a slide whistle mechanism inside the bamboo); long — more than one meter; short — less than 5 cm; and a fuzz-tone shakuhachi that uses a kazoo membrane.

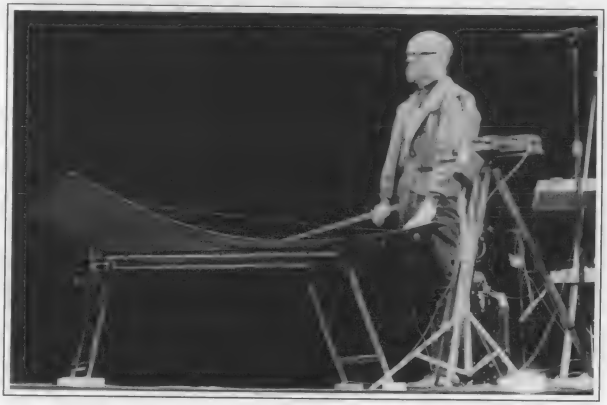
TakéDaké continues to evolve as new ideas for instruments are investigated and different sound textures are explored with new compositions. I have used bamboo from eight different countries in many different configurations: natural tubes, sticks, planks, woven mat, paper, charcoal, and more. It is my hope that people listening to this group will appreciate the wide variety of uses and the beauty of this amazing natural resource. After one of our concerts a friend said, "Thank you for making a vegetarian drum!" Yes, I also feel very thankful for the many unique natural flavors coming from "Bamboo Only."

THE "FUNNY" MUSIC OF NEIL FEATHER

By John Berndt

Funny Ha Ha? Not exactly. Since 1970, Neil Feather has built deeply idiosyncratic, visionary, and highly refined instruments, and developed a broad musical sensibility and technique for playing them. For the most part, it is all completely outlandish. For those that know Neil, it is a truism that his work reduces to no known musical stereotype, though a reviewer once pointlessly anointed him as "The Harry Partch of the Mid-Atlantic Region." Almost any first reaction to his work is just wrong...

Neil's academic background was in sculpture, though as early as age 16 in his group "Tanadril Oxphenbutazone N F Geigy," he was playing instruments of his own design, such as the "Olsen," a stringed plucked Folger's coffee can. Other teenage instruments included an intricate three-pedal wash-tub bass, and a WWII tank radio whose sound was shaped by piping it through a flexible dryer hose whirled over Neil's head. These teenage hyjinks were eclipsed by art school sculpture and ceramics, which ultimately led back again to sound sources with a sculptural presence, sound-oriented performances, and then to more person-scaled "instruments" like his trademark "Former Guitars."



Neil Feather Nondo Solo, Baltimore Museum of Art, 1993
(Photo: John Berndt)

Neil moved from Denver to Baltimore in the mid-80s, immediately followed by his ungovernable collaborator John Sheehan. He, with Neil, had comprised part of the group "Big If" in Denver, and with drummer Patrick Bowers had released an LP on WaxTrax, *Funny Music*. (Sheehan is another shockingly eccentric "genius" whose inventions deserve their own article in *EMI*: "The Horn Guitar," "The Million Volt Guitar," "The Rail," "The Box with a Value of Less Than 10," etc.) Feather and Sheehan quickly became involved with my friend/teacher, tENTATIVELY a cONVENIENCE, and hence with myself, resulting in many years of collaboration and crystallizing in our power quartet, "Something That Dissolves the Shadow of Something which was once Close to Something Which Once Burned Twice," a group which marked a movement by tENT and myself to more focus on instrumental playing (whereas "composed" or "d composed" sound-thinking with unusual concepts and sound sources had been our previous forte.)

Following from the group with the long (and hotly debated) name, Neil and tENTATIVELY became co-directors of the large "Official Project," a complex multi-faceted group which could be described as a sort of self-configuring theatrical experimental orchestra of post-anarchist intent (heavily documented on *The Official Wafer Face LP* and numerous Widemouth Tapes.) During the years spent in Officialdom, Neil supposedly became my "mentor" in instrument building, which operatively meant that we began spending more time together with Neil helping me with the craft side of my own instruments. Eventually we formed our current group, THUS (look for a CD next year or so), and began living and working together actively. In THUS, as in Neil's solo music, there is an organic development of "Strange Idioms," rather like inventing a new ethnic musical traditions on instruments which fall from the sky (except that we build them.)

Neil continuously creates new work and refines old ideas, resulting in different incarnations or models of a basic idea; families of instruments, if you will. Other players owning instruments in these families has led to new music which is outside of Neil's style, most notably tENTATIVELY's baby-Nondo playing and my own additions to Former-guitar technique.

This article is a belated attempt (time and space permitting) to give a larger public a *Cliff Notes* version of this eccentric man's vision, a vision which affects me deeply. Over the years, two

principles have emerged for me as special values of Neil's music:

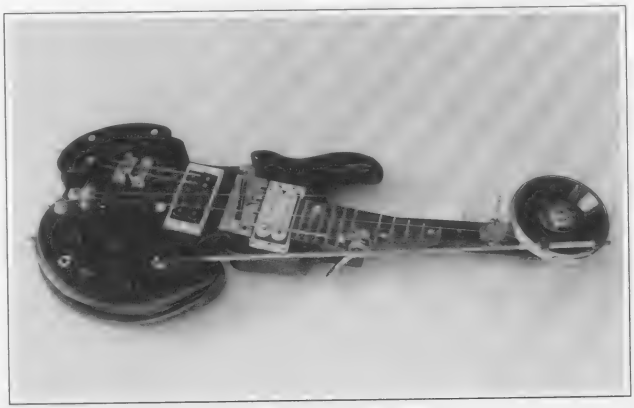
1.) Though his instruments are extremely visual (striking a perfect synthesis between the styles of Big Daddy Roth, Noh theater, Bucky Fuller, H.R. Geiger, and Lazlo Moholoy-Nahgi), it is usually impossible to predict what sound they will produce before you hear them. They are inscrutable. And a related point...

2.) Each of Neil's major instruments isolates and potentiates some acoustical or mechanical property which is usually marginal to music and brings it into the limelight, so that what would usually be kept out of a musical system (like forced contrary motion, Doppler shifts, or uncontrollable phase shifting within instrument reverberations) becomes new musical content. Often, it takes considerable familiarity with the instrument to get the full sense of what is happening acoustically.

Anyway, enough introduction — let me now tell you about the instruments.

NONDO

The Nondo is the "Grand Piano" of Neil's instruments, and a serious crowd-pleaser. A rectangular sheet of steel is held in a long-shallow *U* shape by two pieces of medium-gauge music wire which cross the long-way of the sheet in parallel. They hold the inverted metal arc in tension, and in turn, it holds them in tension, though they can also be individually tuned with tuning pegs on one end. One end of the arc is folded over to provide rigidity to that end of the instrument, creating a ledge or shelf — to which a centered acoustic guitar pickup is attached. This directly transduces the sound coming from the metal.



"Nuguitar" (the third former guitar)
(Photo: Neil Feather)

The instrument rocks freely on a base, which makes it easy to tilt forward or back, changing the tension on the strings and the shape of the sheet's curve. The weight of the body and the tension on the string creates a balance which can be temporarily displaced by rocking the instrument. This is central to playing technique. Depending on which part of the Nondo's ledge is pressed up or down, the tension of both strings may increase or decrease together, or in opposite directions. In other words, the player can use the balance of the instrument to produce contrary pitch motion between the strings.

When the uninitiated approach the Nondo, their first move is always to pound on the steel sheet, getting the resonant CLANG they can see is waiting for them. Wrong! The true interest of the instrument belong to the strings, which are played with a variety of techniques. Since the strings are long and low and attached directly to the metal, a complex acoustical system is in place. The harmonic output of the strings is filtered and reverberated by the sheet and the other string, and fed back into itself, resulting in a tremendous sustain and a very harmonically deep timbre, full of complex phase cancellation cycles. Since the whole system can be smoothly tightened or loosened by rocking one edge of the Nondo forward or back, the phase shifting resonances AND the pitch of the strings can be jointly bent in either direction, resulting in indescribable whorls of cancellation and interference in the upper harmonics — a source of the Nondo's extremely unique sound.

At present, there are several main techniques for playing the strings, all of which can be interact with rocking the Nondo back and forth to alter string tension and body resonances. The first is to simply play the strings directly with a short striker, muting them and stopping them by hand. The un-effected sound of the strings is deep, orchestral and booming. The second technique is to excite the strings and then use the striker secondarily to isolate harmonics towards the ends of the strings, bringing out different, brighter timbres along the same lines as the threads which open up the harmonic vault in the North India Tambura, except with considerably more bite and growl. The final technique involves placing one or more smooth steel bars across the strings, which can roll, be struck, or simply conduct the total sound of the strings through yet another fluidly moveable resonance. With the addition of the bar(s), the Nondo's stranger sound characteristics begin to speak. Striking the middle of the rolling bar with a soft striker produces a bright bell sound which immediately dissolves into a lush, unfurling choral sound, one rich with phase-shifting harmonics. Two bars rolling and rattling against each other produce an angry insect buzzing, with a choral afterburn.

Neil's Nondo solos, combining these techniques and constant subtle bending of the entire system, produce a sort of continuous monolith music, a somber cathedral for microtonal dinosaur thoughts. I can think of no other solo music which covers so brooding a timbral ground; Robert Ruttman's Steel Cello and the long string work of Lucier, Fox and others are distant cousins.

FORMER GUITARS

The "Former Guitars" are a family of modified guitars, which retain little of the regular electric guitar except for basic body shape, strings, and pickup. Still, these are among the only of Neil's creations which, at least from afar, look like something familiar.

They differ from their origins in dramatic ways: frets, if they remain at all, are ignored in playing (except in my own "extended

technique" playing); six strings are replaced by two; the head of the guitar, rather than being rigid, is circular and pivots smoothly in either direction, perpendicular to the joined strings — making them vary in tension from "loose as a goose" (near subsonic) to high guitar range; an "articulator bridge" sits between switchable pickups, allowing both articulation of the strings with varied and special techniques, and bridging to isolate sides of the string (à la Hans Reichel).

Former guitar technique is vast, but tends to revolve around the wide vibratos and extremely long and smooth glissandi which are possible. The instrument doesn't lend itself to precise articulations of tuned pitches at all (à la guitar or piano) but does lend itself to extremely fluid microtonal inflections and dramatic, sweeping glissando-melodies, comparable to what happens in blues and North Indian music. However, the real surprise of the former guitars is that the strings' pitches are inversely related, resulting in built-in contrary motion ("prosthetic musicianship" says Neil). This grounds the sound of the former guitars in a kind of mechanical gravity which gives it a peculiar "modal" logic, much as the frets of a guitar pull its sound towards chromatic relations. On the Former Guitars, the bias is to fluid contrary motion, with resolution on a specific parallel interval which is formed by the system at rest. This is such a weighty convolution of melody and modality, doing such damage to the normal conception of harmony, that it would take another article to unpack it completely.

Much more could be said about the Former Guitars, the variations between different models, Neil's unique philosophy of playing, and of my own experience of playing them for the last seven years. It's regular hilarity to hear Neil's attempts to ape silly or kitsch songs in compressed microtonal approximations on these things. In recent models he has also added various noise-makers which exploit the pickups ("pops and boings") which allow him to punctuate his solos with bells, tines and sub-sonic spring sounds.

VIBULUM

The Vibulum was one of Neil's earliest instruments, and it plays the role of a strange sort of rhythm section in his solo music. A short pendulum swings a device over a fixed position guitar pickup. The device is a ring surrounded by three vibrating cock-ring marital aids, with motors producing three gritty and tunable squarewave pitches. When the device is spun and then swung over the pickup, a complex rhythm emerges which is the product of the motion of the sound sources over the pickup's tiny window of audibility. Three pitches pulse in and out of audibility quasi-randomly, and in quasi-random order. In addition, since the sound source is in constant motion, the fixed pitches continuously bend slightly due to Doppler shifting, creating a rising and falling counterpoint inflection to the relatively sterile squarewave arpeggio. The motors pitches also mechanically vary in interaction with centrifugal force. The whole effect is classical Neil Feather: A lurching and throbbing "subtractive" rhythm, audibly clear yet ambiguous pitches, and a feeling of robotically broken cycles which avoid a regular resolution.

A now-defunct variation, The "Rotary-Vibulum-Reversum" added more dependable motion to the mix. A pendulating pickup swung over vibrating cock-rings kept in perpetual motion by a small turntable.

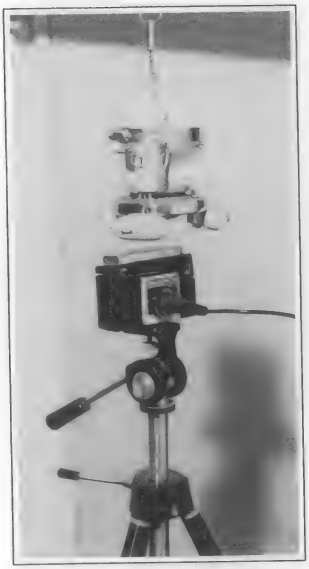
THE CONTRAPTION, THE APEX ROTO-ZITHER, AND THE MELOCYCLE

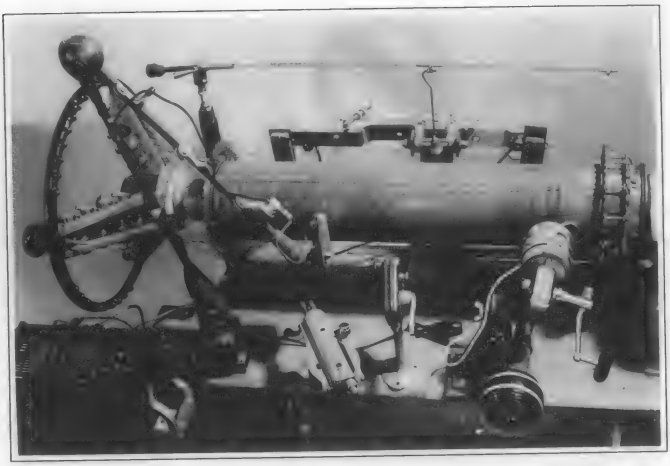
Over the years, Neil has built a loose family of instruments which mix music-box-like characteristics with some unexpected twists. Each has a circular structure of regularly spaced, tuned strings which rotate past both articulating devices (which cause the string to ring by plucking, striking, vibrating, etc.), and pickups which conduct the sound. The pickups are often spaced away from the articulator (or are freely moveable) so that the tones conducted have less or nothing of the attack of a plucked or struck string. Because the strings are put in motion over the pickup(s), the tones are bent by variable Doppler-shifting. On any of these devices the player can control the speed at which the strings pass the pickups, causing the microtonally "pulled" tones. The tuning of the strings, like all of Neil's tunings, are done strictly by ear, by "taste." So far, no formal analysis of Neil's organic tuning choices has been made, but over the years, they have sounded remarkably consistent (though strange) to me.

The Contraption: This was the first in this series and is the most minimal. A large cylindrical zither is rotated by a hand crank on the left. An optional bouncing articulator billiard ball on a string can be employed to make the strings stochastically ring themselves as they turn. The turning of the strings causes the ball to bounce. Stopping the rotation results in a perfect fade-out of intensity as the bouncing ball plays out its force against the string. The player generally cranks the cylinder with one hand, and with the other is able to scan and isolate pitches on the ringing strings with a hand-held pickup. By moving the hand-held pickup closer or farther from the source of the articulation, the sound's envelope can be smoothly varied from a fast bouncing attack (bending the string pitch slightly) to smooth, "bowed" articulations. It is also possible to use the pickup itself to directly bridge the strings as they turn, resulting in a different kind of articulation, and the ability to bend the pitches, à la slide-guitar.

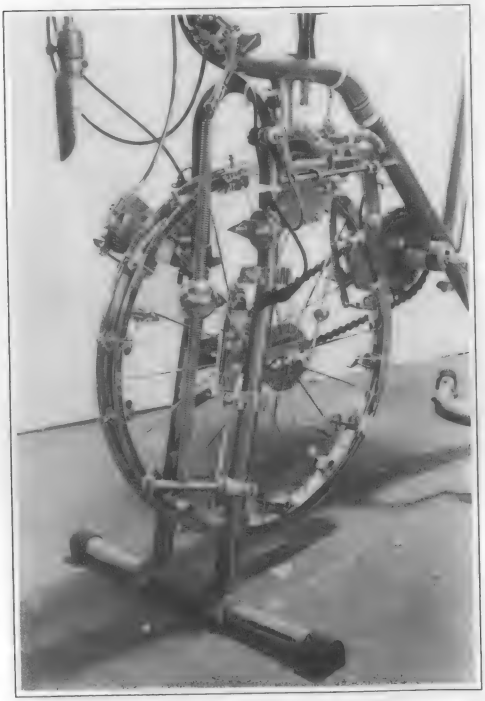
I imagine this instrument as a kind of nightmare for a Serialist composer — repeating sequences of pitches which can reverse or be broken into rhythmic units of different lengths but which always affirm a certain order. The pitches are tuned to a microtonal sequence, and inflected microtonally in a way *inseparable from the speed at which they are played*. When played quickly, the long cycles of pitches blur from melodic to harmonic appreciation, rather like Coltrane's "sheets of sound," or LaMonte Young's soprano sax music of the seventies.

The Apex Roto-Zither: This behemoth was designed (with a "New Forms Regional Grant" through The Painted Bride Arts center in Philadelphia) to take the contraption's principles in a more freestandingly robotic, maximalist direction. A large cylindrical zither is turned either by a slow-moving sewing machine motor, or quickly by a car steering wheel. Various jointed arms hold a bevy of pickups and articulators which cause the strings to ring or pick them up, the latter sometimes with fanciful mechanical tremolo supplied by mounting the pickups on fishing-rod-reels so they could be manually pulsated in and out from the strings. The loose tension of the strings, in combination with some of the plucking articulators, gives rise to a bent, koto-like pitch-attack on at least one of the pickup channels. In combination with other sound channels transmitting other strings which put out stable pitches, this gives the full-on sound a complexly modulating harmony, reminiscent of the density of Iannis Xenakis' treatment





Upper left: The Porta-Vibulum (detail) (Photo: John Berndt)
Upper right: The Melocycle (detail) (Photo: Catherine Pancake)
Below left: The Apex Roto-Zither (Photo: Catherine Pancake)
Below right: Over "Professor Hillbilly's" shoulder, showing Sporadica and Nuguitar atop Melocycle (Photo: Catherine Pancake)



of strings.

One of the strengths of the Apex-Roto-Zither is the dramatic possibility of wheeling it on to a deserted stage and operating it from behind the curtain, like some sort of unclothed mutant guts escaped from The House on The Rock. Its most obvious drawback, on the other hand, is the ambient sound of the sewing machine motor, which is loud enough to drown out the quiet passages in the music. Not to mention its awkward size and weight.

The Melocycle: Neil's music has always had a strong solo or "one-man-band" aspect, and over time he has wrestled repeatedly with issues of portability, miniaturization, and efficient trade-offs between effect and mass — all needed to make low-budget tours manageable. Last year, I began prodding Neil to include "Contraption technology" in his solo music, since he has often demurred to transport the 80-pound instrument. I also suggested that he build something he could sit on and pedal, and the result, rather quickly, was the Melocycle, one of Neil's most refined instruments so far.

Simultaneously comic and strangely musical, the Melocycle allows Neil to use his feet to play a Contraption-like zither built into the wheel of a stationary exercise bicycle. The 16 turning strings are transduced by three pickups which catch the strings at different points in relation to various articulators, allowing Neil to use a mixing board to dramatically vary envelope and cycle-phase-mixing aspects of the sound — a range of sounds between "bowed" melodies and over-modulated chords. One of the articulators, a huge ball bearing optionally held at tension against the strings by two stretched springs, forcibly bounces against the strings at a rate and force which causes frequency and amplitude modulation — producing a weird, heavily modulated sound with indefinite pitch. As a final touch, the tongue of a Jew's harp is excited by moveable leather tabs on the other side of the wheel, adding an earthy "BONG," which is picked up by a magnetic pickup. By adjusting the leather tabs, eight symmetrical articulations per wheel rotation can be turned on or off, creating many rhythmic possibilities.

The whole effect is of a rhythmically driving instrument, capable of accelerating and decelerating tempos and sudden changes of time signature, with a mechanically enforced layering of different sound and pitch sequences having palpable cycles and sub-cycles. Neil often gives concerts sitting on the Melocycle, playing the Former Guitar, Vibulum, Nondo, and Sporadica with his four free hands.

THE SPORADICA

Last year, inspired by the Tambura drone on Henry Flynt's masterpiece, "You are My Everlovin'", I built a small drone instrument, basically an E-Bow driven monochord with a Tambura-like buzzing, meant to accompany my modal Soprano saxophone improvisations. (The E-Bow is a commercially available device which causes a string to ring ad infinitum by exciting it from afar with a rough magnetic field.) My friend Doctor Ackerman nicknamed it "The Sporadica." Much to my surprise, N.F. began to build his own Sporadica, taking the idea of a "driven" monochord in a very different direction from my idea. His instrument is still evolving as we speak, so any description I give here will be extra-tentative. However, it is solid and distinctive enough that it should be brought into the discussion.

Neil's Sporadica consists of two long monochords run in parallel, each with pickups at each end. The monochords are built on a highly adjustable frame made from a discarded store bought "Ultimate Keyboard Stand." Neil places resonant brass *L*-brackets on the strings, which bridge the strings, bounce into the other string, and, when struck, conduct very bright bell-like harmonics through the strings, while wobbling them enough to produce vibrato. At one end of the string, a handle allows the tension of the string to be smoothly increased, allowing the pitches of the whole system to be bent upwards by a minor third. With several spaced angle brackets on the lower monochord, a wavering sound like a chorus of muted Theremins is evoked. There is also something of the Nondo here, with its complex harmonic interference patterns and indeterminate pitchedness, somewhere between a rich bell and a pure sounded strings (only without the cavernous low frequencies).

The first "extended" Sporadica technique to hit the scene involved *L*-Brackets with variable-speed vibrators attached to either side. When let loose on the strings, these devices supply constant articulation to the string, driving it directly — and secondarily through its own chime-like resonances, while simultaneously bridging the strings and frequency modulating their output ... or something like that. The whole system (which I can only hazard a guess at as far as the physics goes), produces a complex drone of indeterminate pitch. By adjusting the tilt of the monochord, the vibrating *L*-Brackets can be made to slowly slide — so the drone subtly transforms as it hits different harmonic nodes in the strings. When two vibrator-equipped brackets are pressed together, a surprising sort of clavè-mamba-samba rhythm takes hold of the entire system. Bizarre.

OTHER INSTRUMENTS

There are many, many other instruments which have come out of Neil Feather's mind that can't get proper treatment in this first pass (which concentrates on his active rig). The endless variations on heavy bowling-ball pendulums, often incorporating springs and magnets. The dueling "Cue Stick Guitars," made from pool cues. The "Hydroencephalophone," a reed instrument terminating in an inverted, water-filled Horsey-head. "The Bomb," a heavy-duty electro-magnetic metal-band thumb-piano which destroyed several amps. The dulcet "Bell Tree" and various thorny canister based slit-drums. The Mexican-derived instruments and others I can't remember. Thank heavens I am writing this article for the one audience that doesn't antagonistically demand to know the rationale and motivation behind this activity.

ELECTRONICS

It's fair to say that so far, Neil's muse has favored the electromagnetic pickup, a key ingredient in almost everything he does. Strings, vibrators, sheet steel, springs, tines, and conductive combinations of the like all filter through regular guitar and bass pickups. On the other end, routed by a mixer, his sounds are treated in a selectively extreme way with various processors. A great fondness for the gritty aesthetic of the Electro-Harmonix company is in evidence, and time was that Neil's solo performances relied heavily on an E.H. 16-second digital delay and "Big Muff" distortion box. These days, more often, home-made tremolo units ("Choppers") provide a disorienting decompression of rhythmic time, while a digital pitch-shifting pedal is occasionally used precisely because it cannot smoothly process such harmonically complex inputs — resulting in sinister, stair-stepped spasms,

more artificial timbres, and yet more indeterminate "pitches."

PRECISELY THIS

The experience of Neil's music is impossible to convey second hand. Traditional aspects of musical utility (apparent independence of rhythmic, melodic, harmonic and timbral qualities) are rotated away in favor of a reordered terrain of new musical content: nuanced, Timbre-Harmony-Melody unifications; rich ambiguous drones; sliding, non-scale-based melodies; and hypnotic, non-stereotypical rhythms, dense with harmonic details. His music has a slow-moving, trance-inducing depth, like some Indian music, but also a giddy and absurd edge which owes as much to Spike Jones, Conway Twitty, and Ennio Moriconne. tENTATIVELY, a cONVENIENCE pointed out certain aspects by calling Neil's sound "Biomorphic Glue," though that doesn't capture its angelic, crystalline, or Skiffle aspects. If I may be permitted to collapse to a pointless and outlandish metaphor: "If the pole sitting craze of the 1920s had involved white elephants, then Neil Feather's music would have been precisely the strange love affair which was going on behind the oblivious elephant's back." May it never end.

Neil Feather can be contacted via phone at (410) 467 9871 or by mailing to 2732 St. Paul Street, Baltimore, Maryland, 21218 (USA).

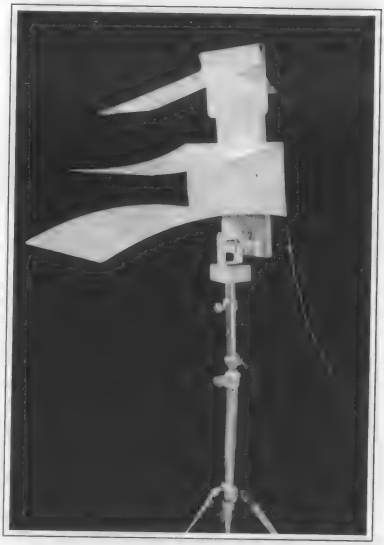
John Berndt is a composer-improviser, thinker, and Neoist who lives in Baltimore, Maryland. With Neil Feather, he is one half of THUS, a sound and light group using unusual self-designed equipment. He is also saxophonist in Music in The Key of Zero, organizer of the local Volunteer's Collective, a co-owner of Normals Books and Records, where he also books the Red Room performance space, director of a graphic design and systems engineering firm, a CD label, and a bunch of other things. He can be reached directly at johnb@berndtgroup.net or by phone at 410 889 5854.

TOTEMS OF IMAGINATION

By Grant Strombeck

The inventive breath alone gives life, because life invents. The absence of invention proves, by counterexample, the absence of the work and of thought. The one who does not invent works somewhere other than in intelligence. Brutish. Somewhere other than life. Dead.

— *Michel Serres, from The Troubadour of Knowledge*



Above: The Gong Totem.
Totem: An object serving as an emblem of a family or clan. The Gong Totem consists of three flexible metal plates attached to a wooden board and augmented by a pickup connected to a reverb unit.

Below left: Sound Tree.
Sound Tree, Gankogui Bells and Bamboo Slit Drum. The tree is connected to a digital delay box.

Greetings my little maquette, my dream harp, and I talk to you, and I think of you in a way that makes me feel foolish. These, my instruments and ideas, are the assemblages, collages and fantasy combinations of an expelled excess of chimerical thought. I am writing this so that I may withdraw from a gunfire-ear-ringing, sing-song babble that makes the illusion of craziness fit right in. I am writing this so that I may call out to you. Hello my fellow practitioners. Hello enthusiasts. Hello you self-oriented *a-types*. Type "A" once meant a candidate for heart attack, but here it bespeaks of other candidates. Artists perhaps. Bob, a vocalist, says he walks down the street practicing gibberish poems and others pass him on the street vocalizing the same vocalizations, but Bob is not crazy. Bob is a Pieter Bruegel of sound and invention. His fantasies pass into a phantasmagoria world of noise. He Bruegelizes sound, but the Bruegelization of sound is not the same as crazy.

I have a corresponding penchant for fantasy, noise and sound alchemy. Making things that are attached to gismos that amplify and alter the reality of simple mechanical concoctions. I call them experimental instruments, but they are only ideas. Instruments as idea. Idea as thought in the form of totems, like false idols that become real only because they are false. Like the unrealizable unable to contain itself. But this is America .... Land of the free and home of the alien abduction shows, and the oddville talk shows, and the shock-jock shows. Land of poetry slams. Land of free-improvised sound annoyances, open-mike, spoken-word, psycho-circus, experimental sound, audio-art and indescribable open-stage theatrical offerings. Land of urges, trance and possession. Land of naked and bloodied performance art. Land where speakers in tongues expressing the delirium of dada in a schizophrenia of radically-open-irrationality swarm like bees on honey in a performance given for a self-liberated-self-audience.

I no longer tell people that I am a musician. "Oh, a musician! I am too. What type of music do you prefer?" One thing leads to another and I end up telling them that I make some of my own instruments. Then I hear a dismissing: "Oh, that's interesting." Sometimes I think there are more categories of music around than listeners. There are more cloned critics for fitting games and the addition of nomenclature than there are explorations into the radical transformations of sound-art. Art is a capital *A-word*. All capital *A-word* art has a generic category or an official moniker. To pigeon-hole and name a thing is to give us a sense of ownership. It is *as if*, when we can name it, we can own it. "Oh, I see, you

are a free improviser." "Yes," I cuttingly reply, "I am an unpaid performer." But the truth is, I use categories as well.

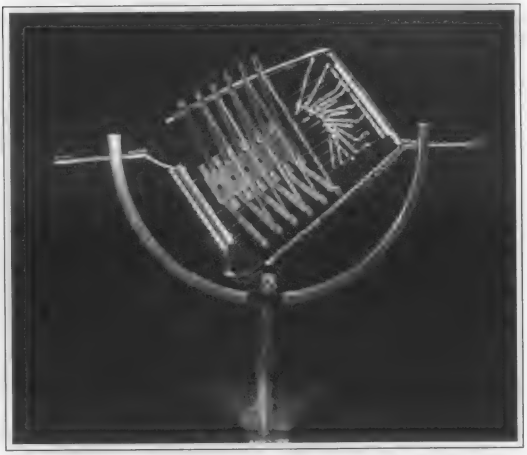
The whole gaseous air of "art" is sticky with unspeakable performing thunderbirds, or free-jazz saxophone Thor Gods; employing objects of hex and voodoo, pin-struck objects, bones in dried skin, fire, rattles, shakers and symbols of no known place. The whole experimental instrument epoch is no longer on the brink. But oddly new, hardly instruments, objects in the absence of meaning, like magic midi wands for the hand wave of air sound, and other more touchable non-things are awash with noise as a part of the general landscape of objects that do not belong to here or there. They fit well in with the glory of refusing to signify anything whatever. They are like things that inhabit places that are places one cannot sense being in. They are present and not there. Things from nowhere and homeless places like alleys, airports, subways, hallways and gangways. Frame-less things from dislocated art galleries and unintentional junk yards. Things from uninhabitable places. Things from places of smoke-filled bang-bang all night going on and on and deeper and deeper into nowhere but imagination. Totems of imagination.

Looking at a painting and thinking the *A-word* is like looking at a painting through a dirty window. Whatever happened to the spirit of the artless? Whatever happened to the artist refusing to be a career professional artist employee? Whatever happened to the quick kiss? The hug? The frivolous wink? Whatever happened to the hearing that listens once? Only sanctioned serious totems of imagination are elevated to categories of high culture, but today, more than ever, to confer the status of "art" on anything is to agree that it is possible to embrace everything and nothing. It is, or we are, caught up in our own game. To let it go... To make it free is not the same as holding on. To love it, is to let it go.

There was once a brainy baboon,
Who always breathed down a bassoon,
For he said, "it appears
That in billions of years
I shall certainly hit on a tune."

— Sir Aurthur Eddington

Grant Strombeck, born in Chicago in 1938, started playing drums at the age of twelve. Noise and percussion led to experiments with pots, pans, tin cans and all manner of sound-producing materials. For more than 40 years he has been an improviser of sound and sound-making things. He has produced a CD and several tapes of his work. He has performed on national radio, in clubs and in many concerts throughout the years. Recently he included his invented instrument, the Flexi Protuberance, in the Shapes Of Sound exhibition held in Milwaukee WI and curated by Hal Rammel. Grant can be reached at 2237 Grove, Berwyn, IL 60402 or email ZNZF25D@ prodigy.com



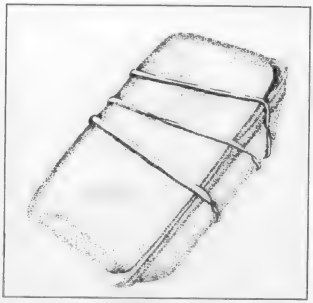
Above: Maquette (Dream Harp)

The dictionary says a maquette is a small prelimnary model of something designed especially to guage the general appearance or composition of the thing that is planned.

This is the fourth in a series of illustrated articles from Robin Goodfellow now appearing in *Experimental Musical Instruments*. Each article presents an idea for a musical instrument simple enough to be made by children. In addition, each article contains the raw material for a lesson plan built around the instrument, including rudimentary principles of sound, elements of cultural lore, and a song or two. With this fourth in the series, Robin presents ideas for plucked string instruments.

PLICKER PLUCKER

By Robin Goodfellow



The scholar Nicholas, of Chaucer's "Miller's Tale," would probably not have been so attractive to sweet Alison had the "gay sautrie" that hung above his bed been made of the material recommended for our experiments here. We will assume that Nicholas' instrument was at least a board, or "sawtree" (another early spelling for "psaltery") across which strings were stretched. Psalteries, classified as "box zithers," are unlike zithers with frets. Nor are they like harps which have their strings stretched free from the resonating soundboard. In psalteries the strings run parallel, across the whole body of the soundboard. Although the instruments I'll be describing in this article might not be suitable for illicit courting, they will have a pleasant, plunky sound, and be most suitable for making instruments with children. We'll call our instruments "plicker pluckers."

An instrument popular in the middle ages, the psaltery is acoustically valuable for the study of three principles traditionally credited to Pythagorus regarding the changing of pitch in strings. With a styrofoam meat tray (or its current environmentally friendly equivalent) and a few rubber bands, we can make a plicker plucker through which two of these principles governing the pitch of plucked strings may be experienced. With two differently sized trays and a few more rubber bands, all three of them may be explored.

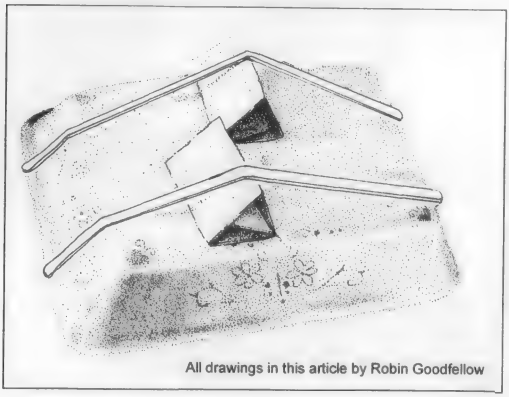
Take a few rubber bands of different sizes and thicknesses. This represents the principle that the mass of the string affects pitch. If the rubber bands are under equal tension, the wider (heavier) bands will play a lower pitch. (According to theory, anyway. Strange things happen with rubber bands.) Unequal tensions, which come about when one rubber band is stretched more tightly than the other, may throw off this relationship. Stretch the bands across the trays, listening to the results. According to the second principle, the more tightly you stretch them the higher will be the pitch. Explore this by pulling some of the strings across the trays more tightly than others. By plucking the strings gently, the different pitches may be heard.

The third rule has to do with length. This may be tested with differently sized meat trays, or trays on which some of the bands are stretched across the short way and some across the longer. The principle holds that, other factors being equal, the longer the vibrating portion of the string, the lower should be its pitch. Once again, variations in the tension on the bands may throw off this relationship.

These tests are not at all scientific. This is an exploration only. By observing pitch changes in relationship to manipulations of these materials, an experiential foundation may be laid down for more rigorous acoustical studies later.

Another experiment with psalteries could be done by trying different types of resonators (such as tin cans) in place of styrofoam trays and observing the results. What other resonators can be discovered and what materials can be used for strings? The things that don't work are as valuable as the things that do for learning about how vibrations travel. If you discover new resonators or new string sources, please share them with me through *EMI* magazine.

It should probably be noted here that while I have used recycled meat trays for years with no adverse effects, it is definitely not recommended any longer. The danger from salmonella is too great. Rather than trying to use harsh chemicals to destroy bad germs, my solution has been to buy trays from a restaurant supply house. They are very cheap this way and can be used for many, many projects with many children. If you want to experiment on a more limited basis,

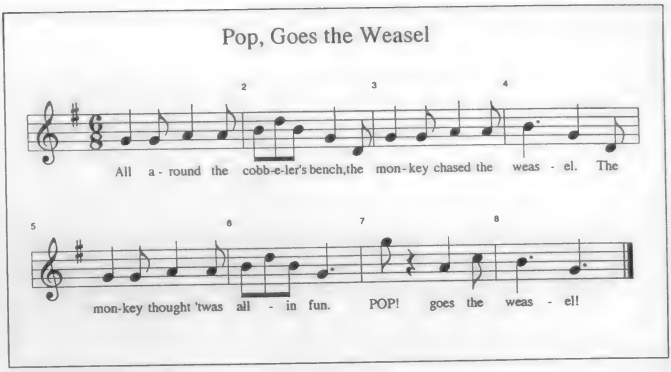


All drawings in this article by Robin Goodfellow

a call to a local children's hospital or toxic hotline might reveal information about sterilizing styrofoam meat trays.

It is possible to tune a Plicker Plucker to *do, re, mi (as* in C, D, E on the piano) and play a song such as "Hot Cross Buns" or "Merrily We Roll Along." A higher note for *so,* or piano G, will allow the playing of "Mary Had a Little Lamb."

Sometimes it is difficult enough just to play one note at the right time. "Pop Goes the Weasel" is a great song in which to add a plucked sound on the word "Pop."



For more interesting pitch experiments, suitable for older children and interested adults, there is a variation on this first simple instrument and another instrument with a slightly more scientific way to test the tension on strings.

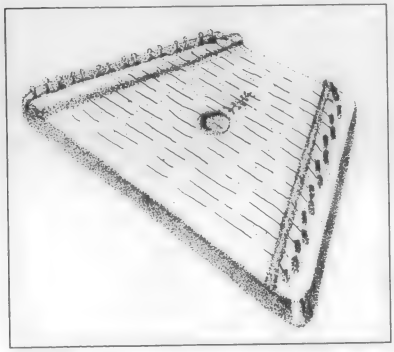
First, the advanced instrument. Bridges may be added to the styrofoam trays. Turn the tray over so that now you are stretching the rubber band across the bottom, not the top of the tray. Cut a strip of cardboard approximately an inch wide and six or so inches long. Fold it in four sections so that the fourth side overlaps and may be taped to the rest of the cardboard, forming a triangle, and there is a bridge for your instrument. The instrument now resembles a koto (with a great stretch of the imagination). Try putting two strings on in this manner, and adjusting the pitches on *both* sides of the bridge. You now have two strings, two bridges and four notes. By holding the instrument carefully, the four notes may be played on the side with the bridges, and two new, bass notes plucked underneath. It is possible to get *ums* from the bass and *pa pas* from the top notes in tonic and dominant chords. It is also fun to experiment a little and come up with unusual chord patterns.

This instrument can be decorated with Sharpie felt pens. Pennsylvania Dutch-type line designs of hearts, flowers and different sizes of dots and circles go well. Keep the patterns as symmetrical as possible for best results. The bridges may be colored also.

Very young children enjoy the joke of hearing the bass notes being played without any obvious, observable cause. The top notes with the bridges are clearly made to sound by the action of visible fingers. The bass notes, hidden beneath the instrument, are mysterious. When they can perform the trick themselves to show a friend, they are delighted.

The instrument for observing a quantifiable amount of tension on a string is made from a styrofoam tray, a soda straw, thread or light cord, a small yogurt carton, and a lot of pennies. Instructions for making it appear on the following pages.

If by now you or a young person near you have developed a desire to go further with psalteries, there is a wonderful instrument designed for children and available through many catalogues. It is designed in such a way that music especially written for it is slipped underneath the strings, on top of the soundbox, with lines to follow. By plucking according to the diagram, even small children can make satisfying renditions of favorite tunes. If you take the trouble to stick small note names or solfeggio names under the strings, regular music can be played. The instrument can be tuned to a variety of keys and scales, and costs about $50.00. The name is the Music Maker, and they are made in Belarus, distributed by Peeleman/McLaughlin Enterprises, Inc. 4151 South 300 West, Murray, UT 84107, USA. Two of the many catalogue sources for these award-winning instruments are: Hearthsong at 800-779-2211 and Back to Basics Toys at 800-356-5360.



Robin Goodfellow is the director of Mandala Fluteworks, a studio of music and art in Oakland, CA. She has been teaching children and adults for many years, and plays flute, piccolo and tin whistle among other instruments. She is the original founder of the Queen's Ha'Penny Consort, a recorder and early instrument group that specializes in the performance of Renaissance music.

Robin draws from her extensive collection of musical instruments to provide illustrations and articles for EMI, where she has been a regular contributor for eleven years. She is developing a set of notecards featuring her drawings of instruments, most of which have appeared on the pages of EMI.

Robin can be reached at 1655 Vista Street, Oakland CA 94602, by phone (510)530-7835 or by email robingoodfellow@earthling.net

She would appreciate information about stories and legends of instruments, and ideas readers may have for simple instruments suitable for children to make and play.

More →

A CHILDREN'S INSTRUMENT FOR OBSERVING QUANTIFIABLE TENSION

Step-by-Step instructions from Robin Goodfellow

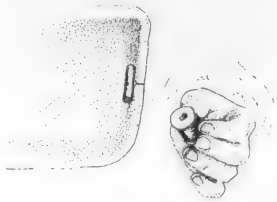
1. First pierce the center of the bottom of a small yogurt carton (TCBY brand is flexible, yet strong). Make a small hole large enough for your string or thread to go through.

2. Pierce a similar hole in the center of the lid.

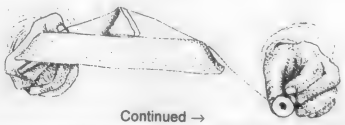
3. Cut a strip of cardboard approximately an inch wide and six or so inches long. Fold it in four sections so that it forms a triangle with the fourth side overlapping, and tape it as before in the "koto" instrument.

4. Cut a piece of soda straw an inch or so long. Tie the soda straw section onto the end of a piece of thread, very lightweight cord or fishing line, by pulling the end of the thread or cord through the straw, looping it back and tying. If this is difficult, make a small slit in either end of the straw to hold the thread while you pull it through and tie the knot. For very young children, it is sometimes helpful to wrap a piece of tape around the end so that they can poke it through the straw. This can be cut off later if desired.

5. Cut a small notch in the center of the short end of the tray. Lay the straw in the inside of the tray, pull the thread through the notch to the bottom side of the tray.



6. Pull the thread over the bottom of the tray which is now the top of the instrument, over the bridge and down over the other end of the tray.



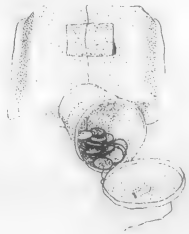
Continued →

7. Put the end of the thread through the bottom end of the yogurt carton, pull it through the inside and then through the inside of the lid. Now tie it around another similar piece of straw, putting a notch in the straw if necessary to hold it in place while you tie the knot. The thread should now go from the tray through the end of the carton, inside the carton, through the inside of the lid and out the other end, which is the top of the lid, where it is prevented from falling back through by being tied to a straw (or button, or whatever). Put a few pennies in the carton and close the lid.

8. Place the lid firmly on the carton and let the carton with the pennies hang upside down, pulling the string taut. Pluck the string and hum the note it plays. If you can't get a clear pitch, it might be necessary to change the length of the string; it might be too long or too short. Also, if there is not enough weight in the carton to start with, it might not be pulling the string sufficiently for it to sound.

9. When you have a clear pitch that you can remember well or match with your voice to help you remember, then find that note on a tuning device of some sort. A small electronic keyboard works fine. If the note lies "in the cracks" between a black note and a white note, add or subtract a few pennies to bring it to a recognizable pitch.

10. Add or subtract pennies to see how many it takes to raise or lower a pitch by a half step or a whole step. Is it always the same amount?



If twenty-five cents will change a note a half step, will a quarter have the same effect? Even a bright twelve year old was stumped by this one and had to put it to a test. I wonder if this would make a good Science Fair Project, with graphs showing the relationship between the pitch of the string and how many pennies it takes to achieve it.

RECORDINGS REVIEWS

By Warren Burt, Mitchell Clark, Bart Hopkin and Dean Suzuki

ANIMIST RECORDING:
HANDS TO EGRESS / TSII'EDO'A'TL (THE WOOD THAT SINGS)

LP from Anomalous Records, Animist Recording, PO Box 45753, Seattle, WA 98145

Here is a newly released vinyl LP with nothing on an otherwise white front cover but a 3½" x 5" photograph of a dead cactus plant in the desert set against an astonishing blue sky. The back cover is the same, but with a different photo. Neither does the disk itself have any writing on the label. There is, however, an inserted sheet with some liner notes. The notes are written in the first person but unsigned, and no single person is credited as the creative force behind the project, though several are mentioned as having participated or provided inspiration.

To quote from the notes: "*Egress* is a song cycle comprising short songs played entirely on the remains of dead cactus found in the Sonoran Desert outside Tucson, Arizona." Many of the sounds are from the saguaro cactus. "When a saguaro dies, its outer skin rots and falls away, leaving many long straight 'ribs' ... These ribs were bowed, usually with another (broken) rib, and the resulting 'cry' could be heard some distance away." Other sounds in the recording came from drumming on saguaro stalks. The agave cactus also appears in the recording, in the form of a crude version of the Apache violin. Agave were also played with percussion and indirect friction, and a few other cactus species and sounding techniques appear in the mix as well.

And what does the cactus music sound like? Lots of scrapy sounds, some with clear pitch and some without; some identifiable string sounds; some resonant thumps and bongs; some deeply evocative low whistling sounds; some higher whistles too; some sounds like animals eating crunchy things; some otherworldly groans and moans; some squeaky sounds, coarse but gently mournful; lots of crackly stuff; some sounds almost like water. A few passages with graspable melody and rhythm but more passages dealing entirely in texture. Many short sections with recognizably distinct sound characteristics, yet blending together to form a seamless desert listening.

—BH

THOMAS BLOCH: GLASSHARMONICA

A.D.L. - GFI 007

THOMAS BLOCH: TIRAGE LIMITÉ

A.D.L. - TGB961 (A.D.L., 75, bis rue de Paris, 92100 Boulogne)

This new installment in the discography of the glass harmonica features the French player Thomas Bloch. *Glassharmonica* is a collection of Classical-era pieces by the late 18th-century composers who specialized in the instrument, and includes works by J.G. Naumann, J.F. Reichardt, and J.A.P. Schultz, as well as the pieces written by W.A. Mozart which form the cornerstones of the repertoire. As the Classical repertoire of the glass harmonica is not too well known at present, it is not surprising that many of the pieces on this collection are premiere recordings. The type of glass harmonica played by Bloch is that invented by Benjamin Franklin, called *armonica*. For a discussion of the glass harmonica, the repertoire, and some of these composers, I refer the reader to my review-article "Music as Fragile as its Material: The Classical Repertoire of the Glass Harmonica" in the September 1995 issue of *EMI* (vol.11, no.1).

As is often mentioned in histories of the glass harmonica/armonica, the instrument and its sounds were often associated in their day with nervous diseases which were said to be brought on by the instrument. Bloch, in his liner notes for this album, relays some of the accounts of this problematic side of the instrument. These range from one self-study primer's warning, "It is true that the Armonica has strange effects on people...." (J.C. Müller's *Teach Yourself Armonica*; 1788), to the fact that the principal 18th-century concertizer, Marianne Davies, died in a mental hospital. And J.M. Roger, in his *Treatise on the Effects of Music on the Human Body* (1803), comments that the glass harmonica's "melancholy tone plunges you into dejection ... to a point the strongest man could not hear it for an hour without fainting." This sets the stage somewhat disconcertingly for the album to which one is about to listen. *Glassharmonica* lasts an hour and five minutes.

It is true that the tone of a glass harmonica, with its high partials and its somewhat scratchy tone, can be something one would not always want to take in one long continued dose. Yet, as glass musician Dennis James' recordings and concertizing have shown, the instrument can be beautifully played — and tremendously appealing.

But J.M. Roger's assessment of the glass harmonica does not augur well for Thomas Bloch's recording. The instrument (made by Gerhard Finkenbeiner), as presented here, does not make for the most comfortable listening. The tone can be scratchy almost to the point of grittiness. It may be the instrument, the playing, the recording, or the mastering of the recording — or some combination of these. Adjusting the treble control of one's playback system can help.

Bloch's selection of pieces is broad-ranged — within the standard repertoire, itself largely limited to German-speaking countries in the late 18th century. As mentioned, a number of the selections are premiere recordings, including those of works by J.J.S. von Holt Sombach. The Sombach *Adagio* for glass harmonica and strings is a lovely find. The album's supporting musicians include classical instrumentalists to play in the ensemble repertoire, as well as two *sopranists* — male singers who have specialized in the soprano range and perform the music intended for *castrati* — who perform in a work by David August con Apell (1754-1832). A soprano is included for the "Mad Scene" from Gaetano Donizetti's *Lucia di Lammermoor* (1835), included here with its original glass harmonica part (later replaced by two flutes).

Thomas Bloch's *Tirage Limité* shows another side of his musical activities, and is entirely of compositions by Bloch. As to unusual instruments, the album features Bloch performing not only on the glass harmonica, but also on cristal baschet (which uses rubbed glass rods) and ondes martenot. There is also the ubiquitous piano and synthesizer. But we don't hear much of the glass instruments — they are generally used as supporting texture and it is not always easy to follow their presence. Exceptions are two solos for glass harmonica: "Grave" (track 5), a progression of harmonies over a pedal point, and "Irisation" (track 10), a short chromatic work.

Most of the music on *Tirage Limité* is of a pleasant-enough jazz/pop style, often with dense, overdubbed keyboard-based textures. At its best it brings to mind the textures of Brain Wilson's *Pet Sounds*. Additional styles in *Tirage Limité* include the pseudo-classical, *à la* "Grave," and the atmospherically atonal, *à la* "Irisation." Supporting instruments include saxophone, trumpet, bass, and percussion. *Sopranists* are also here on a couple of pieces.

Overall, the work on *Tirage Limité* is less successful musically than Bloch's earlier *Christ Hall — Homage à Marc Chagall* (reviewed by Mike Hovanscek in *EMI* vol.7, no.3). *Tirage Limité* does however include a *Christ Hall Remix*, about a third of the duration of the original piece. *Christ Hall Remix* focuses on the sopranist and not on the glass instruments which were more in evidence in *Christ Hall*, and were part of that work's primary interest.

—MC

PASCAL COMELADE, PIERRE BASTIEN, JAC BERROCAL, JAKI LIEBEZIET: **OBLIQUE SESSIONS**

Evva/ Les Disques du Soleil et de l'Acier C0DSA 54054/evva 33012 (Evva, 155-8 Oba-cho, Aoba-ku, Yokohama, Japan; Les Disques du Soleil et del'Acier, BP 236, 54004 Nancy, France, fax: 33 3 83 32 30 47)

This is a marvelous collaboration between four of France's most distinctive, idiosyncratic and experimental musicians. Perhaps best known to *EMI* readers is Bastien and his Mecanium: mechanized, reconstructed and deconstructed sound-making devices frequently using conventional instruments with various belts, pulleys, motors, and erector set materials. However, better known, though still obscure, is Comelade, who appears to be at the musical helm of this project. For years, Comelade has been an iconoclast on the French musical scene, composing brief works, a kind of experimental cabaret music that is part Penguin Café Orchestra, part Erik Satie, anti-conformist, and part Brian Eno, visionary — in fact, the CD is entitled *Oblique Sessions* after the cards known as Oblique Strategies created by Eno and artist Peter Schmidt. Each card offers an aphorism which provides directions such as "Emphasize the flaws" or "Disconnect from desire" when one comes to a creative impasse. Comelade is best known for performing on a variety of toy instruments, including plastic guitars and ukuleles, toy saxophones, toy drums, and melodica, with a special fondness for the toy piano. He also plays accordion, piano, organ, and various guitars. Along with Berrocal and Liebezeit, Comelade and Bastien, in various combinations, perform mostly acoustic little ditties composed by the participants, as well as a couple of quirky covers of rock and pop numbers by Neil Young and Can (a typical Comelade idiom). While some may be put off by the simple, even naive quality of the music — and it is here that the Penguin Café Orchestra and especially Satie analogy is important — the more progressive listener will keep in mind that simple music is not equivalent with simplistic music. This is both charming and experimental, and altogether wonderful.

— DS

JOHN HERRON: **AVID RABBITT PERCEIVES THE BASIC**

Cassette available from John Herron, 544 E. 3635 S. Salt Lake City, UT 84106

John Herron is known for his many clever ways of recording — achieving effects using low-budget technology that would otherwise be unobtainable, or possible only with much more expensive equipment. (See *EMI* Vol 11, # 3, and *EMI* Vol 12, #1.) He's also a first rate percussionist, and on the strength of this1996 cassette, collagist and sampler or tape composer. The album mostly alternates between straight ahead rock sections, with repetitive rock beats and a wildly improvising solo guitar line; and more atmospheric sections of various sampled sounds, synth lines, and voices. Lots of playing with variable speed here, and many interesting timbral effects — some undoubtedly the results of his recording techniques, such as using a contact mic on a cymbal to record an acoustic instrument — I thought I heard that one on the last track on side one. But all is not quite what it seems. The rock beat will be going along predictably, but suddenly there will be other sounds in the rhythm — samples, bits of radio, etc. Then suddenly, there will be a *cut* to a non-rhythmic section, and in the middle of that, a loop of a repetitive drum riff will be inserted, as if the difference between regular and irregular sounds was being blurred, and all sounds, regardless of their character, were being treated as material for Herron's sonic mixmaster. New elements appear on side two — electric piano and bass lines along with what sound like processed synthesizer chords produce an almost ambient feel. Then, suddenly, just when the mood seems to be established, in come those unyielding guitar and drum lines again — which leave just as suddenly as they appear. A humorous ending is provided with a cheap computer voice synthesizer which speaks some extremely bad poetry — sort of like a computer speaking rap in regular rhythm, but with no emotion, the wrong tempo and the wrong inflection. I find Herron's music extremely pleasant to listen to — his sense of wandering through a diverse sonic dreamscape consisting of many sounds and references is attractive, and I look forward to more of his music.

—WB

ANNEA LOCKWOOD: **THE GLASS WORLD**

¿What Next? Recordings WN0021. PO Box 344, Albuquerque NM 87103

It was not so long ago that there were very, very few recordings of sound sculpture and invented instruments. ¿What Next? managed to dig up a classic of the genre, one of the first that this writer added to his collection, and one which still stands up conceptually and musically. *The Glass World* had its origins in a concert of 1966 entitled *The Glass Concert* which later gave way to a record issued in 1970 on the tiny but brilliant Tangent label from England. New Zealand composer Annea (aka Anna) Lockwood took ordinary forms of glass: panes, rods, discs, "rocks," bottles, jars, bulbs, and the like, and extracted a multitude of sounds by striking, rubbing, bowing, immersing in water, and otherwise manipulating the glass objects. This experimental approach to exploring materials and sonorities yields a remarkably rich and colorful spectrum of sounds. That being said, the sounds are relatively simple and straightforward and are presented in brief vignettes or etudes.

The album begins with a large, flexible, thin sheet of glass

which is shaken. The sound of the bending glass is exactly as you might expect, with the added dimension of tension vis a vis the drama inherent in the anticipation that the glass might shatter. Another sound is a water gong, in which a pane of glass is partially submerged in water and struck. The glass is raised and lowered in the water, thus altering its pitch. Timbres range from conventional percussive sonorities to nearly human vocal timbres, and much more. This is one of those recordings which belongs in the collection of everyone who loves the world of invented instruments.

—DS

VOLKER STAUB: **KOMPOSITIONEN FÜR STALHSAITEN, BAUMSTAMME, UND GLASGLOCKEN** (Compositions for Steel Strings, Tree Trunks, and Glass Bells)

CD from Deutsche Akademie Villa Massimo Rom. Available from Villa Massimo, Largo do Villa Massimo 1-2, I-00161 ROMA ITALY, or from Volker Staub, Hermannstr. 5, D-63263, Neu-Isenberg, GERMANY.

Volker Staub is a German composer, born in 1961, who builds his own instruments and writes large scale pieces for them, as well as for other, more conventional instruments. This CD, a result of his 1997 residency at the German Academy's Villa Massimo studio in Rome, contains three (or four) pieces, made with three of his instruments — the Steel Strings, the Tree Trunks, and the Glass Bells. The Steel Strings are just that — two long steel strings, one five meters long and the other eight meters long, each of which, at one point in their length, pass over a bridge mounted on a large oil drum which acts as a resonator. The strings, played here by Staub himself, are played by bowing, striking with bamboo and metal rods, and by rubbing with a rag soaked in alcohol, which sets up longitudinal vibrations in the strings. The tree trunks are just that — three large tree trunks, which are mounted at the nodes on two large metal stands with foam pads on top of them, and which give forth a large variety of pitches and timbres when struck with wooden beaters. Staub's notation for these, in fact, reflects the nature of the instrument — the notation indicates where along the length of the trunk to strike, and not the pitch to be produced. The Glass Bells are an openly acknowledged homage to Harry Partch's Cloud Chamber Bowls, and consist of a large number of glass containers varying between 5 and 60 liters, from which the bottoms have been removed. Both the Trunks and Bells are played here by percussionist Dirk Rothbrust.

Staub's music is extremely sparse and quiet. Often just the nature of the single sound is his focus. The first part of the album is a superimposition of two very sparse, quiet pieces — "Waldstücke Nr. 24" for three tree trunks, bird calls and rain sticks, and "Weiche Gesange Nr. 26" for steel strings. So sparse are both these pieces that superimposing them often results in long solo sections for each instrument. In live performance, the dramatic presence of the performers would undoubtedly carry the viewer through the silences. Here, on a recording, the idea of superimposing the pieces is a good one — there's always some activity, even if it's just pin points on a canvas of silence. Even when the rate of activity gets a bit more lively, such as the faster, more rhythmically regular tree trunks and string rubbing duo about eleven minutes into the first movement, the feeling is still one of calm and stillness — as if this more active section were the equivalent of a breath of wind on an otherwise very still pond. The second piece, one movement for Glass Bells solo from a much larger multi-instrument composition "Fünf Stücke Nr. 29," is denser, but still extremely sparse, low key and quiet. The third piece, again a movement from a larger work — this time a solo for two Tree Trunks, is livelier, and more pulse-oriented, but still maintains the feeling of quiet and containment that pervades the whole disk. Staub's voice is unique — very centered, unruffled, unhurried. In a world where so many other people's music seems to be getting denser and denser, I found his austere, contemplative approach extremely refreshing.

—WB

THE SHADOWS: **SHADOWS ARE GO!**

Scamp Records SCP 9711-2

Not too well known in the United States — and certainly not to be confused with The Shadows of the Night — The Shadows were an English instrumental rock quartet which existed, all told, from 1958 to 1990. In their heyday, which was the first half of the 1960s, they made a great many number-one hit instrumental tunes and their lead guitarist, Hank Marvin, influenced a great number of guitarists.

Despite the fact that they have remained largely unknown in the United States, references to The Shadows have been around. The story goes that "Cry for a Shadow," The Beatles' first recorded original number (written in 1961 by John Lennon and George Harrison) — and one of their very few instrumentals — carries a reference to The Shadows in its title (even though The Beatles apparently did not care for The Shadows — nor is Harrison's lead guitar style at all like Marvin's). A generation later, the instrumental introduction of The Pretenders' second single, "Kid" (1979), is built upon a quotation from The Shadows' "Atlantis" (1963).

The brilliance of The Shadows is in Hank Marvin's electric guitar playing. Marvin has been long acknowledged as a primary influence by guitarists ranging from Jeff Beck to Bill Nelson to Jody Harris. This album shows much of Marvin's most famous guitar work. His liquid tone has an uncanny balance of a solid strength and a seductively beautiful surface. A trademark of Marvin's, described in the album's liner notes, is his use of the guitar's tremolo bar, which he would anchor snugly in the palm of his right hand while he flat-picked with that hand. His use of the tremolo bar gave an inner life to the sound of the guitar, allowing a smooth vibrato during chords. In what he displays here, he may not be a lightning-fingered wonder; his virtuosity is in his inventiveness about how to draw sound out the instrument. In this, together with an impeccable technique, he seems to almost re-invent the sound of the guitar from one number to the next.

Shadows are Go! is a selection of twenty-three tunes from 1960 to 1966. Remarkably, this album appears to be the first stateside collection of the band which, in the niche of instrumental rock, was supreme. As the history and many forms of the electric guitar have been examined at various times in these pages, Hank Marvin's work should be of great interest. To those who haven't heard The Shadows, be, on a certain level, warned — these tunes are seldom what could be called brilliant pieces of music. But at their best they are the perfect vehicle for The Shadows as a band and for Marvin as a soloist, and that combination is great to hear.

— MC

Further reviews note: The cassette *The Anonymous Family Reunion* by Volunteers Collective (Widemouth Tapes, 3809 Melwood Ave, Pittsburgh, PA 15213, USA) is reviewed in conjunction with its companion book and video in the book reviews in this issue.

THE ONE-FOOTED DRUM KIT

by Niles Hokkanen

I play the mandolin; been at it for nearly 30 years. Around 1985 or so, I really started to investigate rhythmic/accompaniment approaches deriving from the vocabularies of other instruments (electric guitar, mountain banjo, Cajun fiddle, piano/organ, etc.) and applying them to the mandolin. Since the ear hears accompaniment from the bottom up, I was tired of acoustic guitar players screwing up my tunes with square, unfunky grooves; I decided to make the mandolin so self-sufficient a rhythm instrument that it would pull any other instrument into its orbit groovewise.

I had always, in past years, looked at Elka bass-pedals (organ style footpedals, one octave or octave + fourth, but as an independent unit with built-in tone generator) in music stores from time to time, but never could do much when I tried them out. Five years ago I was in Florida doing some sideman session-work, and a friend of mine and I went to some clubs. At one place there was a jazz guitarist playing bebop tunes, walking the hell out of a one-octave set of bass-pedals. "That's for me!" I decided, and bought myself a set of midi-pedals within three months. The initial stages were physically awkward and painful. I couldn't play an alternating root-fifth bass line for more than 5 to 10 minutes without my left leg feeling like it was being ripped out. About the same time I had also taken up karate for various personal reasons, one of which was to do something totally unrelated to music and musicians. However, everything connects, and martial arts was to become an important factor in my future musical development.

Photo #1: Niles Hokkanen, mandolin in hand, with bass pedals under his left foot, and the entire drum set up under the control of his right foot.

Besides building up flexibility, coordination and leg strength, allowing me to make much better progress on the pedals than would have occurred otherwise, the karate also carried over into thought processes. I first experimented with various foot percussion — tambourine on the ground, taps, etc. in order to try and add a backbeat and lift the plodding nature of just root/5th on the first and third beats of the measure. When I got a surplus hi-hat from my wife's drummer son, things began to develop, and I began to try to expand the potentials of the percussion by attaching more pedals and other drums/cymbals.

The first pedal was the "Up-Kick Hi-hat Pedal." This was simply a hinged flap mounted on the stand suspended above the foot, which had a rod attached which would strike the bottom hi-hat from below. By kicking upwards, I could now get an open high-hat strike at the 8th note level. I had a small bass drum and several bass drum pedals (past experimentation) around the house, so I tried attaching the kick drum pedal perpendicular to the high hat, so I could play it by rocking the heel. There was a process of attaching plywood and rubber pads to the hat pedal in order to balance the relative heights of the pedals for ergonomic comfort. Fine, now I had low-high capability and could try some kick/snare patterns. I also discovered that if the hats pedal was depressed and I raised my foot, I could strike the up-pedal with the instep and get a closed high-hat strike. (Not important at this stage but significant when the snare was added.)

When you throw different karate kicks going up and down the length of a gymnasium floor, each designed to strike the opponent with a different part of the foot, it's not a huge mental leap to applying those same ideas to the percussion/drums. Next was a kick-forward pedal which would strike a cymbal mounted in front of the hats. Then I decided to add a second cymbal mounted on a tube rising from the top of the bass drum, and built a pedal which would be struck sideways (to the right) with the outside part of the foot. This pedal would rotate a wheel which would push a rod upwards into the bottom of the cymbal. At this point, the overall drum sound was starting to build up, and mounting a tambourine on top of the hi-hat still wasn't enough to balance the sound. We had an unused snare drum so I constructed a cpvc (the cream colored stuff — slightly different size than the white pvc tubing) lever, attached to the bottom of the hi-hat pedal, that would rotate a wheel-mounted beater (kick-drum-pedal style mounting), striking the snare which was mounted on its side. So when ever you closed the hi-hats, the snare would also sound. The upkick pedal then would allow me to ghost in interim hi-hat sounds between the bass-snare pattern.

Some other additions to the early versions of the drum kit were a second "kick forward-left" pedal (small tom-tom), a cowbell

striker (mounted to left of the hi-hat pedal, also depressed) and a second snare beater, hand controlled by a rod which terminated with a padded disk about 6-7 inches in front of my waist. All the original prototypes were made of wood, 1/4" bolts (axles) and 1/2"cpvc tubing and 7/16" dowel rods which telescoped into the tubing for adjustability. I used various configurations of this drum kit on gigs, but often, it was just the hi-hat, upkick pedal and front-kicked cymbal. I only experienced two wood fatigue breakages — on the upkick pedal mounting, and on the rotating wheel of the sidekick cymbal pedal — and these were repaired with sheet metal and glue.

Since I was using primarily just the hats on the Scandinavian music duo gigs with my wife, I opted to buy another hi-hat stand so I could leave the full kit set up in the basement, minus one or two pedals and cymbal. However, the new hats stand proved to have a different leg tripod configuration as well as different tubing diameters meaning that I'd have to build another upkick pedal at the least since the one I had made wouldn't fit it.

Having had the time to live with the previous generation(s) of the drum-kit, I knew what the current deficiencies were, and resolved to improve the design for: 1) fast and easy attachment/reattachment of components, 2) strength and compactness, 3) more adjustability, and 4) smoother action, etc. While retaining plywood bases for some of the units, much of the redesigns incorporated 3/4" x 1/8" aluminum or steel bar rather than wood, tapping of the drilled holes and use of machine screws, nylon washers (natural lubricant qualities) and nylon-insert lock nuts. The resulting appearance was much more "manufactured," eliminating an issue of contention between my wife and I. (She felt that a crude home-built looking contraption would reflect negatively on my musical reputation among the non-playing public.)

While there are various possibilities for the configuration of the various pedals and what drum or cymbal each controls, I'll try to explain my particular kit setup and how the various components of the current rig were constructed. There are a lot of different components; examine the photos on the following pages if the construction description needs clarifiction.

UP-KICK PEDAL (Hats) [See photo #3]: The bottom of the new hats stand was 3/4" tubing. I bought a metal microphone holder (the J-clamp/metal bar type) and bent the metal bar to a 90 degree (down) angle from clamp, and had hinges welded to the end of the bar, leaving a little overhang (from the pin) which would act as a stop. (I later found it helpful to reinforce part of this assembly to make it more rigid.) The pedal itself

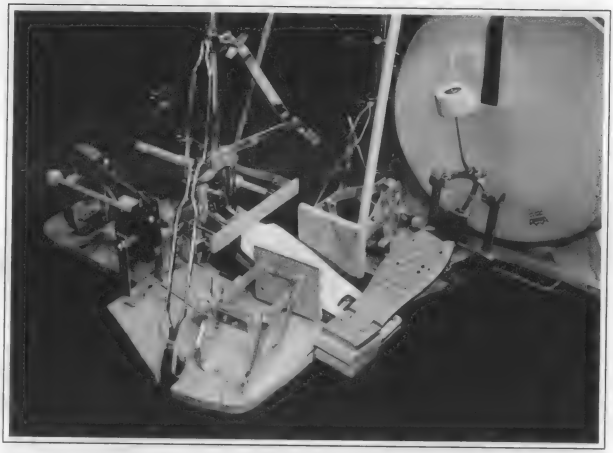


Photo #2: All six pedals. Note the mounting block anchoring the bass drum pedal to the hi-hat pedal. (Yellow paper was placed on the hi-hat pedal for this photo to make it more visible.) Snare drum not mounted in order to show the two snare beaters.

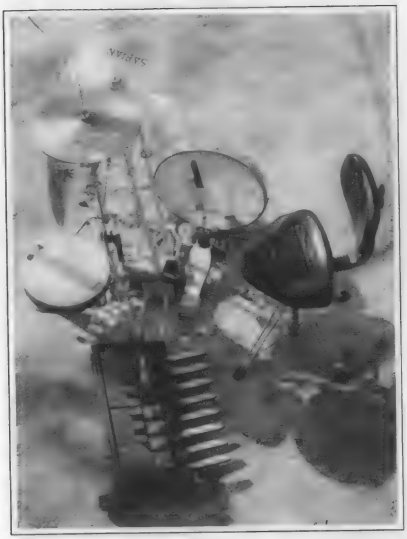
was made of pine 1"x 3", 6" long, and I attached a second piece of wood on top which extended outwards in order to provide a larger contoured area for the instep strike. The ends of these pieces were angled and rounded, and a rubber pad (approx. 3/16" thick) cut from a flip-flop beach sandal attached. The striking rod was a length of 7/16" doweling which telescoped into 1/2" cpvc tubing. At the striking end of the rod, a rounded car tire lug nut was attached for greater volume. A thumbscrew in the tubing is used to adjust the rod length. I attached a U-shaped piece of 1/8" x ¾ aluminum bar to the end/top of the pedal, and then attached a piece of (cpvc) tube coupler via a machine screw drilled through both coupler and U-mounting. Then the rod is simply inserted into the coupling.

GUIDE FERRULES [photo #4]: All the rods require a guide of some sort to direct the striking motion. The original versions were made of wood blocks with appropriate tube-sized holes (to fit on the hi-hat or cymbal stands), and 3/8" dowels on which these guide ferrules were attached like square flags (with holes) at one end of the dowel. The dowels were inserted into a second hole in the mounting block and positioning was adjustable via a thumbscrew. On the new rig, I used an electrical conduit clamp (for 1/2" tubing) instead of the wood mounting blocks, and welded a 5/16" rod-coupler to it. A hole was drilled and tapped in the coupler for a small thumbscrew which would be lock/adjust the position of the ferrule. The ferrule itself was a large washer or metal ring welded (or steel epoxied) to the end of a 12" length of 3/16 square rod and this unit is inserted into the coupler. (Unlike round rod, square rod would be held firmly, without any rotation in the coupler, by the thumbscrew). The unit as a whole is then clamped to the hat-stand about 6" below the hats.

BASS PEDAL [photos #5 and 2]: The bass pedal is perpendicularly mounted on top of the heel of the hi-hat pedal, so that the hinged heel of the bass pedal hangs past it. To keep the two pedals attached together while playing, I had to make a bracket/base. So, I attached a square piece of 1" x 3" to half of a 2" x 4" piece of sheet metal. The other half of the metal piece is screwed into the top of the heel of the hats-pedal. Another block of 1" x 3" is screwed underneath the heel of the bass drum pedal. When the two blocks were positioned over each other, I drilled a couple holes through both blocks of wood, and inserted set screws halfway into the bottom of the bass-pedal blocks so that the screws act as pins which insert in the other block (drill out the female holes in the hats-block.)

However, before any of this is done, you'll probably have to modify/lengthen the stabilizing rod/bar which connects the heel of the bass pedal to the beater stand. The whole drum pedal can be mounted, with the pedal-heel elevated, onto the hi-hat pedal. If it's bar, just replace it with a longer piece of 1/16" or 1/8" aluminum bar. (Some bends may be required and you'll have to experiment a little to find the right length.) If it is rod, you'll have to make a similar, but longer rod (3/16" is fine).

The full set-up



I also made a pedal-stop in order to keep the beater from resting on the drum when the pedal is depressed. This was simply a 1/4" bolt which was connected to two conduit clamps which were mounted on the legs of the beater mechanism, at a height which keeps the beater off the drum head by 1/4" or so. Play, and rocking movement in the whole pedal/drum unit lets the beater actually strike the drum. The stop bolt was also covered with tape and rubbery material, as was the portion of the underside of the pedal which would be in contact with it, to eliminate metal on metal "clinks".

I bent the mallet rod in the middle and positioned it so that the beater end is pointing toward the drum. I did this because the beater had a tendency to hit me in the leg on the comeback (release) due to the perpendicular position of the pedal assembly.

BASS DRUM & MOUNTING STAND [photos #5 and #2]: In the early versions I used a small (16") bass drum from a kid's drum set. In the latest setup, it was replaced by a 16" x 2" frame drum. The advantage of this is that it takes up a lot less space, as well as being more appropriate volume-wise for use with acoustic instruments. I made a wooden holder/base for the drum which is held in place by a pair of knobbed screws (through L-shaped brackets) which clamp down on the drum frame. I inserted a piece of U-shaped 1/4" steel rod through the wooden base , to serve as a substitute for the lipped rim of the bass drum, to which the pedal attaches. (A square 1/4" U-bolt from the hardware store would work as well or better). I drilled holes into some short pieces of 1/2" dowel and screwed these onto the ends of the rod, that poked through the base, as stabilizing legs.

HI-HAT PEDAL modifications [photo 6]: Chances are, with the bass pedal mounted perpendicularly behind it , the high hat pedal itself is now too low height-wise and it needs to be raised up somewhat with a piece of plywood (attached by flush mounted machine screws) and/or with a rubber pad. With this new stand, I only needed to raise the level by about 1/2", so I cut out a piece of flip-flop rubber to the appropriate shape and thickness (a hacksaw works the easiest) and steel epoxied it (using JB Steel brand) to the top of the pedal. I also glued the cushioning on the heel of the pedal as well, so that the high hat was comfortable to play by itself when I wanted to use the hats alone without the bass drum/pedal.

Flip-flop rubber is a superior material to work with because it is dense and durable; I'd buy the stuff in pieces but I can't find it anywhere except in the sandals. A little cushioning on any of the pedal surfaces isn't a bad idea since you are kicking against them all. However, it is best to have a 'slick' cushioned surface on other pedals so there's no momentary 'grabbing' of the socked foot. I got some scrap boot-sole leather from a show repair place and intend to surface the vertical pedals with that material.

SNARE DRUM [photo #7]: For portability and volume balance, the real snare drum was replaced by a 12" x 2" hand drum which has some shortened drum-snares stretched across the top. The snares at this time are held down with duct tape across the straps.

I originally tried out a vertical mounting, as I had used with the real snare drum. However, since this was a one-headed drum, not enough rattle was produced in this position. Only when the drum was mounted horizontally with the snares on the top of the drum head would the sound approximate the real thing. Therefore the beater would have to be designed to strike the underside of the drum. This factor allowed for convenient mounting of the drum to the hi-hat stand itself rather than needing a separate mounting stand. I drilled holes in two of the legs of the high-hat stand and inserted machine screws (pointing outwards). I then drilled holes in the frame of the snare-hand drum so it could be mounted (parallel to the floor) onto those machine screws and be secured with wing-nuts.

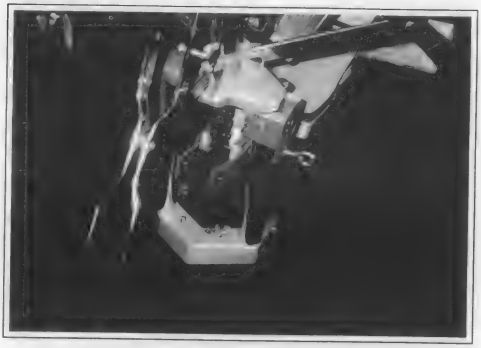
SNARE DRUM BEATER MECHANISM [photo #8]: I made a lever which offsets to the left out of 1/8" x 3/4" aluminum bar. At the fulcrum (a piece of U-shaped bar with a machine screw serving as the mounting), the lever has a slotted hole on each side, necessary because the motion of the high-hat pedal, to which it is attached, drives the lever forward a little bit as the pedal is depressed. The beater cam is mounted on an axle held by a piece of U-shaped bar, and a linkage arm connects the end of the lever and the beater mechanism. A tension spring is attached to the beater cam and the wooden base, making for a quick snap-back return of the mechanism and hats pedal. The actual beater is a wooden ball mounted on a length of metal tubing which is inserted into a hole drilled into the cam. (I tried using 3/8" wooden dowel at first but it proved to be too heavy and made the response somewhat sluggish.) To attach the beater mechanism to the high hat pedal, extension arms of steel or aluminum bar must be attached to the end of the high hat pedal with machine screws. These arms go about an inch or so past the high hat chain drive, and near their ends, holes are drilled so that the snare beater lever can be attached with a screw or cotter pin.

The whole unit will rock up and down on the floor as the pedal is depressed, unless anchored firmly into position. If you are using a floor mat, Velcro (hook side) can be attached to the bottom of the baseboard, which is what I did in the early prototype. However, a hole can be drilled and tapped through the base of the high-hat stand and a machine screw inserted coming up from below. Screwed into the beater baseboard is a piece of aluminum bar, extending towards the hats-base, with a hole at the end attaching to the hats-base with a wing-nut. Action is adjusted by the separation width of the high hat cymbals. Normally the pedal causes both the high hats to close and the snare drum to sound. There is a little bit of play in the snare beater mechanism, but this has positive qualities. When the pedal is depressed, the snare beater will move until it is in contact with the underside of the drum head. At this point, I will lower the top hat cymbal a little bit, letting the pedal rise. The snare beater now is not resting against the head, but will still strike the head because of the play in the mechanism. It is possible to adjust the hats so that the snare beater never makes contact, in which case the pedal functions only for the hi-hats. Or it can be set so that light foot action only sounds the hats, but more force causes the snare to sound - this is a tricky dynamic situation, but is possible to control with practice.

FRONT KICK CYMBAL PEDAL (Cymbal Pedal-1) [photo #9]: I redesigned this mechanism for the new hats-stand. Because of the construction of the high-hat

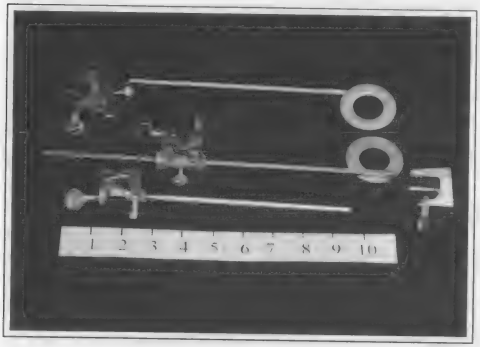
Above: Photo #3. Hi-hat upkick pedal

Below: Photo #4. Upper part of photo: Drive rod guides for cymbal #2 and up-kick pedal. Lower part: Mounting for 14" crash cymbal — attaches to hi-hat stand.

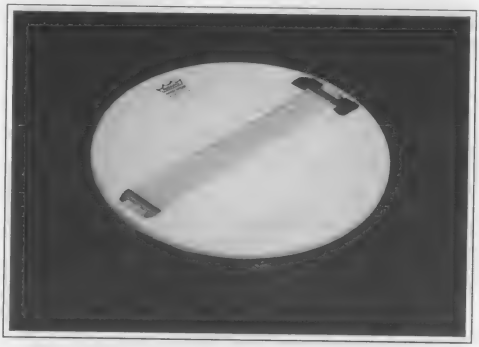


Above: Photo #6.The base of the hi-hat stand. Notice extender arms at the chain drive end of the footpedal — this is where snare pedal #1 is connected Also, at the base, note the connecting bolt to which the base of snare pedal #1 is attached/stabilized.

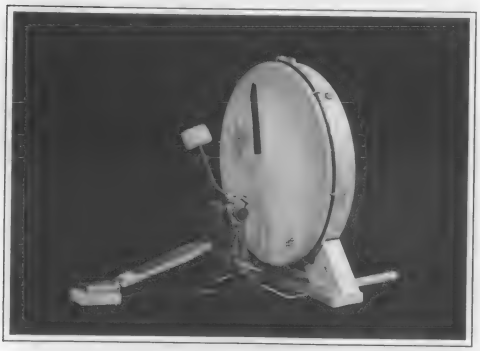
Below: Photo #7. "snare drum" — 14" hand drum with snares attached.

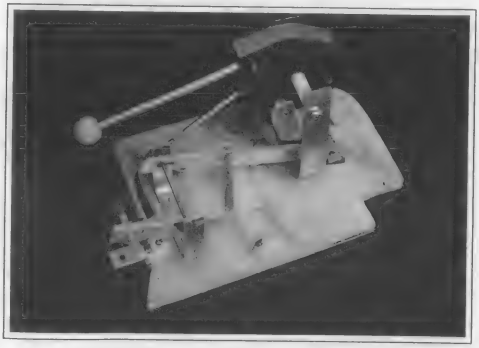


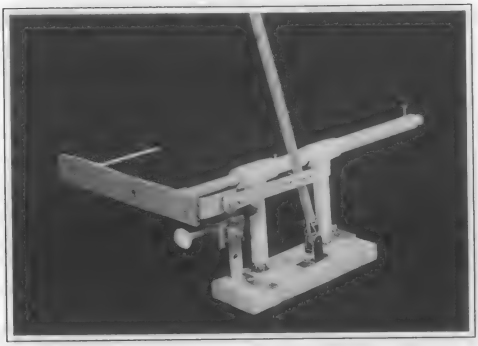
Below: Photo #5. Bass drum pedal, mounting and drum.



Below: Photo #8. Snare pedal #1. Note the short metal bar at the end of the base — this attached to the base of the hi-hat stand. Also note the wing nut/setscrew in forground of the base — snare pedal #2 attaches to this for stabilization.

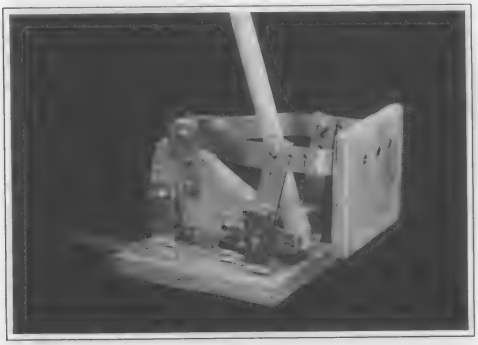




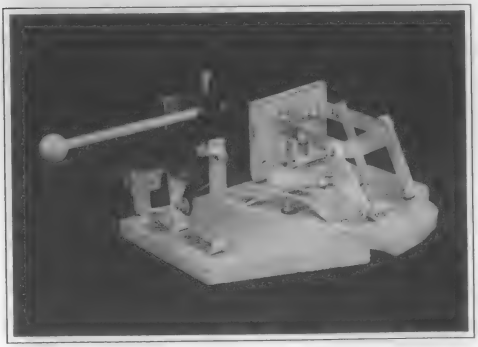


Above: Photo #9. Cymbal #1 pedal. Tension on the internal spring is adjustable via the plug length at the end of the tube secured by a pressure screw. A bracket with a U-clamp connects the pedal to the hi-hats base.

Below: Photo #10. Cymbal #2 pedal. The connecting/stabilizing bar at the back connects to the kick drum stand.



Below: Photo #11 Snare pedal #2. Take notice of the driving wheel which redirects the pedal movement into the drive shaft. Also at the far left of the photo, there's a clamp mounted on a bracket; this connects to one of the tubes of the hi-hat stand base.



stand, this pedal had to be designed right or left-handed, i.e. the pedal and mechanism form an L-shape in order to easily mount to one side of the hats-stand. The base consists of a piece of pine in which two short lengths of 7/16" dowel were inserted as legs. The mechanism frame was constructed out of 1/2" cpvc tubing using 2 T-joints so that Cpvc legs could telescope over the wooden dowels and be adjustable for height (thumbscrew). A 1" long slot was cut into the forward end of the primary tube. The Cpvc housing serves both as frame structure and as mechanism component. Mounted onto the base is a metal L-bracket which has a conduit clamp attached. This will clamp on one of the two base tubes of the hats-stand and anchor the unit.

The pedal itself was a 1½-wide by 3/16" thick piece of oak attached to an L-shaped piece of aluminum bar. On the other side of the aluminum bar, toward the L-end, a metal tube base (bought at a marine surplus) was fastened to the bar. Into this base went a length of 7/16" dowel, which was inserted into the Cpvc housing. With some experimentation as to how far the pedal should extend toward the foot, the length of the dowel is determined and marked where it exited the far end of the tube and then cut 3 or 4 inches shorter. A compression spring is then inserted into the end of the tube, followed by a dowel plug (longer than needed, so it can be adjusted if necessary) which is held in firmly by an adjustment pressure screw. Remember the slot cut into the front end of the tubing? A small screw (#4) is screwed into the dowel (which is now inside the housing) along the slot. This screw serves as a stop to keep the pedal from shooting out of the housing on the rebound due to the compression spring.

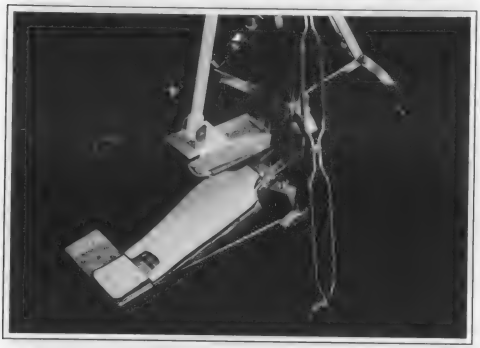
The actual beater is a long length of dowel, attached to the wooden base by a hinged coupler. A short piece of aluminum bar is attached the short L part of the pedal, and to the beater several inches above the base via a cotter pin. (This linkage bar pushes the beater forward. I drilled a number of holes along the length so that I could easily adjust the action/position of the beater by using a different hole position for the beater pin.)

I had hoped that the stop screw would also function as a stabilizer to keep the one-sided pedal from flopping down. It did, but the contact and friction of the screw against the side of the slot was countereffective to smooth operation. There had to be some sort of support on the other side of the pedal, but still allow the unit to be easily attached to the hat-stand from one side. The solution was to screw in a 3" x 1/4" hex-head bolt into the metal pedal frame at the other end. A metal guide ferrule, to support this guide bolt, was made with another metal conduit clamp, a piece of aluminum bar and a small eye-bolt.

FRONT KICK CYMBAL MOUNTING [photo #4]: The forward, vertically mounted cymbal is a 14" crash. It's mounted on a high hat clutch. A 1/4" x 7" hex-head bolt (smooth shaft) is screwed (and epoxied) into a conduit clamp. Then the head is sawed off. This unit can be clamped onto the upper tube of the hats-stand and the cymbal slides onto the rod and positioned via the clutch. So the cymbal is adjustable in regards to the height and how far in front of the high hat stand.

CYMBAL PEDAL-2 (Sideways to Right) [photo #10]: This pedal redirects a sideways-to-the-right movement of the foot into an upward thrust of a striking rod into a tripod-mounted 16" crash cymbal. I bent aluminum bar is into a stirrup-shaped frame (6-1/2" x 4"). I screwed the 1/2" plywood pedal surface (4-1/2" x 3-1/2") to the bottom of the stirrup. I attached the other end of the stirrup to a triangular shaped (60-30-90 degree) rocker lever made of plywood and aluminum bar. The rocker moves on an axle mounted 2" above the plywood base on a metal U-bracket. The pedal is held up by two long aluminum arms (3-1/2" long) which I mounted on another base U-bracket on one end, and at the other end I attached them to the front end of the stirrup frame with machine screws (axles). The pedal unit is held up and can move forward/back smoothly on the arms. At the long end of rocker lever is a Cpvc coupler which

Photo # 12. The stripped down setup: hi-hat stand plus the upkick pedal. Note the mounting block to which the bass-drum pedal is attached.



moves freely on a machine screw axle, and into which the striking rod is inserted. Again, the rod is CPVC tubing and telescoping dowel, and is maintained in a strike position by another adjustable guide ferrule which is clamped on the cymbal tripod shaft. (Different materials — auto lug nut, wooden ball/knob, etc. can be attached to the contact end of the dowel to change the tone and volume of the cymbal strike. Right now, I'm just using the dowel alone. Bart Hopkin discusses various beater materials in his fine book Musical Instrument Design.

The base of the unit is linked/stabilized via a metal connector to the bass drum stand, keeping it securely in place. Alternatively, velcro on the base bottom could also be used.

SNARE DRUM PEDAL-2 (Sideways to Left) [photos 11]: This was the most recent addition to the set. The rationale behind adding this pedal was to facilitate drum rolls and flams, which are difficult to play with successive down taps with the ball of the foot (on the hi-hat/snare pedal). By bouncing the foot between a side pedal and down pedal, much greater speeds are possible and comfortable. Snare-2 was a modification of cymbal-2 pedal except that motion had to be directed 90 degrees horizontally to the front rather than upwards. The wooden pedal surface was mounted to a rectangular metal frame with three metal rocking arms to hold it upright and allow back/forth movement. After musing over the options for physical redirection the movement, I made what in essence is a simple one-toothed gear by inserting a 1½"x #8 machine screw through a hole drilled in a 2" diameter wooden (toy) wheel. A piece of aluminum bar with a slot cut into it was mounted on the pedal frame, pushing/pulling the wheel clockwise/counterclockwise for only 1/6 of a rotation. A metal extension arm was also mounted on the wheel (amplifying the motion). At the end of this bar the drive shaft was attached. The wheel rotates on a 1/4" bolt mounted through the 1" plywood base. A metal bracket serves to keep the bolt from wobbling and to raise the wheel to the height needed to hook into the slotted arm. A hole in a 1/4" rod coupler was drilled so the coupler could freely rotate on a machine screw at the end of the driver wheel extension arm. A 12" piece of 1/4" rod serves as the drive rod. The beater assembly is much the same as the other snare beater. U-bracket mounting, and wooden wheel and beater (cannibalized from my original snare-pedal mechanism.). A piece of leather belt was attached to the beater wheel, and through a hole at the other end, attached to the metal drive rod. Action/position of the beater is adjustable using nuts on the drive rod to determine how far along the rod the belt is locked. As the rod is forced forward, the belt pulls the beater upwards into the drumhead.

PLAYING THE SET: As I said, I am a mandolin player. My experience with playing a conventional drum-kit is almost nil, though I may put one together and put in some practice (as a drummer) as a learning tool and perhaps take a few lessons. However, on the one-foot kit, I've adapted kit patterns from the numerous books in my personal library. Most of the grooves revolve around bass/snare patterns, implying a reductionist approach. Obviously one can't keep time at the 8th or 16th note level on the hats or a ride cymbal. However, open or closed hat strikes can be inserted in the holes between the bass-snare patterns, to ghost in the hats. Also, many of the kit functions are duplicated on other instruments within an ensemble. The steady 8th or 16th hat patterns can be duplicated with rhythm guitar/mandolin strum, or in lead playing. (James Brown's bands functioned as one gigantic drum kit.)

Multiple strikes: The easiest combinations are: 1) Bass drum and 16" crash (sideways R), and 2) snare/hats and 14" (forward) crash. This allows one to add the cymbal accents to the basic bass/snare grooves. A little more difficult to control is bass and snare/hats together, as the foot must strike downward with both the ball and the heel equally on both pedals. It is also possible to combine snare/hats and 16" (sideways L) crash, or even a triple strike of bass, snare/hats, and 16" crash. As with any newly built instrument, I think that one finds techniques which can exploit the instrument beyond the designed-in functions. One builds the instrument, and then discovers exactly what it is capable of by accident and practice.

I practice various rudiment exercises and kit patterns on the drums alone to improve right foot movement control/coordination. But I also play these patterns with bass lines (left foot on one-octave set of midi-bass pedals), or with bass and mandolin. Keeping three syncopated rhythmic balls in the air can be a real mind bender which really develops split-brain processing abilities. (Actually it can be four or five parts, if there are two parts being played on the mandolin, and a vocal is added!) The challenge of filling all the functions of the rhythm section by yourself is a real education of how grooves are put together.

PERMUTATIONS AND ADAPTATIONS: If both feet were free, the left foot could control a mirror-image drumkit, or a kit that had some variations as to percussion setup. It would be possible to achieve a very fat drum kit sound, while still leaving the hands to play another instrument(s). Some of the features of my kit could be incorporated into a conventional drumkit, which could give the hand work some extra freedom. Obviously, the idea of three-dimensional striking in six directions to six or more target areas could be adapted to some type of electronic drum-triggering configuration. Or, if it's electronic, it could be pitch triggers ... introducing the "Bass-line Cube".

Niles Hokannen is on the progressive cutting edge of mandolin playing in the USA. He is the author of numerous mandolin instruction books/tapes, and has recorded with cajun fiddler Michael Doucet, harmonica monster Howard Levy, and Appalachian dulcimer experimentalist Jerry Rockwell. His On Fire & Ready! *Cassette touches on the entire spectrum of roots music. Niles published the* Mandocrucian's Digest, *a magazine for mando-family musicians, from 1986-1997, as well as writing for numerous music magazines including* Acoustic Guitar, Strings, Acoustic Musician, Fiddler, Frets, *etc..*

Niles can be reached at PO Box 3585, Winchester, VA 22604.

THE DURKIAN REGISTER

lecture by D. Rangola

We cannot see behind our heads. But we can hear behind them...

I wonder if you've ever traveled to an environment where all the sounds were foreign. Where even the wind sounded different as the air swept past. The example that comes to mind is that of a forest in a distant land. A place with new animal and insect calls to hear, and perhaps rattling leaves or high whistling cliffs to costume the breeze.

In such a spot, as I've succumb to on occasion, with the eyes closed there is little to keep one on track as the mind takes extravagant leaps in order to place what's being heard. Now, should a central voice become framed within this sound space, and itself be of an exotic nature, there comes into play a force of focus that seems to be almost desperate, resolving the central voice as if it were catapulted forward by its surroundings...

a piece flung off of the surrealistic mass.

D.R. Rangola. 7-90

THE DWORKIAN REGISTER

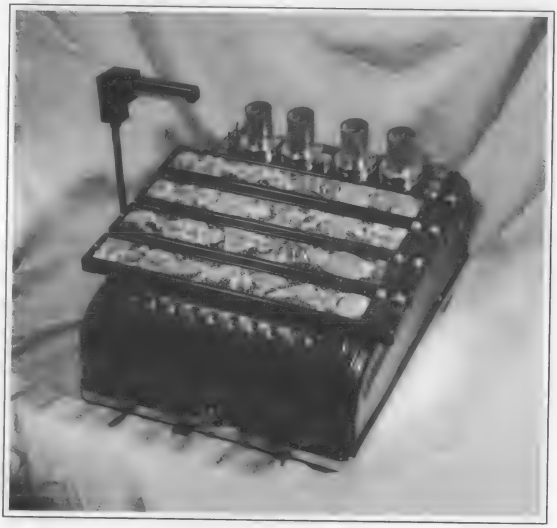
by Q.R. Ghazala

(Continued from previous page)

Part of this effect, it seems to me, comes from the listener being completely surrounded by the unusual, hard-to-place sounds. In this environment a person is transported to a new space. And so, it seems, is an instrument.

While the means of musical orchestration is a well-explored art, nearly all examples set the instrument grouping right in front of an audience that fully expects to find them there. That's all pretty strange for critters that can hear behind their heads, isn't it?

Meant to address this idea of surround-sound art for surround sound-sensed-creatures, the Dworkian Register is a four-channel instrument with which to create and explore 360-degree sound fields. Abstract, surrealistic sound fields, the type of which circuit-bending* so easily produces.



The Dworkian Register

The Dworkian Register is named after and inspired by John Dwork, a "natural" circuit-bent instrument player. John is also a celebrated writer, publisher, chef, overtone singer, flying disc champion, multi-media director (see article's end), explorer, philosopher and practitioner of life in the fullest... which in Johnny's case also finds him as a clergyman. John holds the title of Rabbi Phun G Badillion of the several-thousand initiate-member Phurst Church of Phun — "a theatrical/comedic 'religion' honoring the spirit of the Holy Phool archetype and practicing the zen art of Crazy Wisdom". Which is how I came to meet John since, like all good clergymen, his duties include befuddlement. Circuit-bent instruments are now part of the Phurst Church of Phun's high services and Phestivities.

During my construction of Johnny's first instruments, any incoming call of his would be announced by means of, if not his own vocal eccentricities, the small but outlandish voices of those tiny-speaker sample bank toys seen everywhere now... cartoon sound effects, farcical voices and absurd noises. After listening to these assorted phone messages, at times with Johnny's voice mixed indistinguishably within the synthetic ones, I became intrigued and began to pursue sources for these sound banks with circuit-bending them in mind. Johnny's personality, shall we say, is reflected further in the Dworkian Register's design ...but let's leave some surprises for later.

Before I go on, I'd like to quell the suspicions that the Dworkian Register is only a silly-sounding multi-channel toy, as nothing could be further from the truth once the electronics are adjusted just a wee bit. As is the usual case with circuit-bending, the nudge into anti-theory design realities opens strange new doors.

Perhaps you've seen the children's books that come with an electronic, pressure-sensitive sound strip at the right-hand side. This strip, contained within a slim plastic housing, is printed with cartoon-like drawings that depict characters or places out of the book's story. Pushing the right picture at the indicated point within the text will result in the triggering of an appropriate sampled sound, having waited all this time for us to finally relieve it of its infallible sensibilities.

Four such story book strips make up the basis of the Dworkian Register. Each one's signal is now delivered to a separate output jack on the instrument's case, being that of a nicely styled old metal adding machine known as the Comptometer. Every strip contains ten different sounds giving the machine forty voices in all to work with. These strips are sound — modified by circuit-bending in one way only: severe frequency alteration by means of both body-contacts and master pitch dials.

Once a sound strip has been pulled from the cardboard of the book's back cover it will be possible to remove the revealed screws and access the electronics within. To find the points on these (and many other) circuits that can adjust pitch, snip one lead of a suspect resistor on the board (trial and error) leaving enough room to re-solder the lead ends back together if the wrong resistor is snipped. Since the pitch of all voices on the board is probably

*"Circuit-bending" refers to the process of creative short-circuiting by which standard audio electronics are radically modified to produce unique experimental instruments. A further description of these techniques can be read in *EMI* Volume VII #1, Sept. 1992.

set with such a resistor, replacing the correct snipped one with a potentiometer of the right value (try 500K to 10 M) will likely give you an adjustable range of speed/pitch from ultra-high to very, very low. Two body-contacts can be wired to the two active lugs on the potentiometer as well, opening the instrument to the direct bio-modulation of the player's touch as electricity is safely passed through the flesh. In addition to a new pitch control and two brass body-contacts, each of the four sample banks also has a new volume control, a new shut-off switch for its tiny built-in speaker, plus a new envelope LED inside its own Lucite cylinder chamber at the top of the instrument's housing. These LEDs have their own switches as well. Being able to turn off speakers and pilot lights when they're not desired saves power and can purify voices. Both the line outputs and LED envelope indicators can be derived from the speaker signal, voltage adjusted downward if needed with "trimming" resistors or miniature potentiometers.

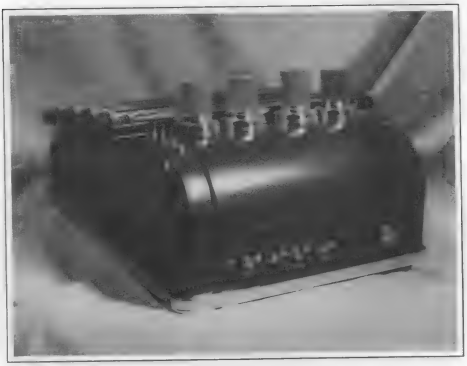
Another body-contact effect was also discovered. The small brass knob situated amidst the Lucite light pipes is connected to a transistor lead of one of the four panels containing a nice assortment of rhythmic percussion sounds. Touching this contact will cause any of its panel's sounds to seamlessly repeat until released.

Resulting from these modified circuits are sounds that live far outside their prior contexts. First of all, an important fact as noted many times in these discussions, "toy" sample bank outputs often provide a frequency range much wider than what the device's little speakers can reproduce. Just feeding this signal into an amp will do wonders. Then adding equalization and just a very slight touch of reverb to help materialize their space can supply a sense of presence to these voices that has them easily escape their "toy" entanglements.

When you take these sharpened voices, like a door creaking, water bubbling, train track rhythm, person laughing, wild animal sounds of all kinds, musical instrument noises, different spoken words, machines, insects, atmosphere noises, all kinds of abstract "comic" sounds... when you take these voices and begin to alter their speed with their circuit-bent pitch controls, odd new meanings emerge. A lion's roar, sped up, becomes an insect chirp. An insect chirp, slowed down, becomes a lion's roar. But not the insects or lions we know about. Rather those in that distant land, where we have to imagine what the sounds are all around us. And **all around us** is the key...

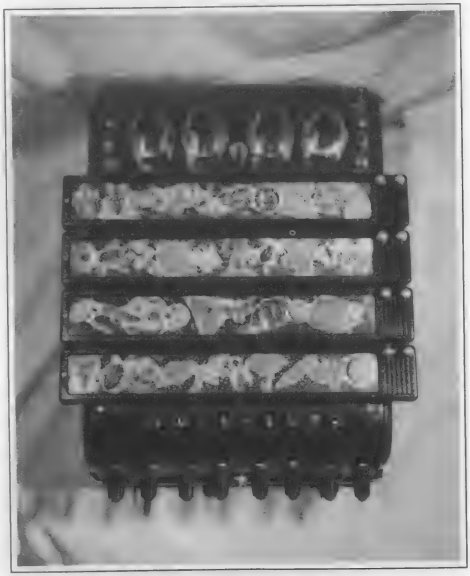
The Dworkian Register, as noted, is a four-channel instrument. Its four outputs are meant to be run into a mini-mixer also controlled by the player. The mix is then routed into a four-channel sound system whose speakers are situated to surround the audience. In this way these new, wildly surrealistic voices can be panned throughout the listening space, creating a distinct alien setting in which to support other instrument performance, perhaps scattered about or moving throughout the area.

Low volume sounds, seemingly distant sounds, quiet background sounds emanating from the surrounding speakers, can create a hypnotic field to listen within. At very slow speeds voices can last for minutes, seemingly drifting through space or hanging in the ethers. These voices can be further animated by touching the respective bank's body-contacts inducing sweeps, trills and such. A very nice effect is had through balancing three similar of these slowed-down voices equally throughout the sound field, giving the feeling of being in the midst of the habitat of some native creature. And then, at random intervals, with the remaining



Above: Four outputs on the back of the case

Below: Control panels



sound bank's pitch turned quite high, interjecting from it here and there within the mix a few of the resultant quick, shrill little calls... still distant, still unfamiliar, with an occasional cry or two mixed closer at hand. Here is created a sonic environment that immediately captures the listener, it being punctuated with a familiar, even natural scheme of support and detail regardless of the unusual qualities of the sounds.

Achieving a workable balance of sound is easy, having forty sounds spanning a good frequency range to begin with even before expansion through the pitch controls. Designing a

repeatable series of very different sound fields to set instrument groupings within is very possible, as you probably can imagine.

Extending this theme of alternate realities further into the instrument are its interfaces. A type of sonic surrealism comes into play while activating the forty different sounds since their cartoon drawings have been replaced with new artworks. From within my rubber art stamp collection I chose forty images, many being reproductions of fine engravings. These images were stamped, by means of masking in the "3-D" style, so as to appear floating over each other. They were colored-in with blended color pencil; this layout was then scanned into Photoshop to add the backgrounds, and finally printed out, cut into strips of ten images each and placed over the membrane switches that trigger the sounds. These strips are the same dimensions as the originals with cartoon drawings and fit into the housings in the same way. I've added clear plastic overlays for protection. What is the suggestion in pressing a picture of the moon and then hearing a baby crying? Or the back-and-forth sound of a saw emanating from a jellyfish? Who is the mooing mushroom calling? What amuses the giggling oak leaf? I decided to allow this eventual matching to fall entirely by chance, a visual extension of the misplaced voices now generated by the machine. These four panels, along with their associated new pitch and volume controls, are named after each panel's leading image: acorn, eye, gingko and jellyfish.

Metallic purple-black, with hand-inked red control lettering under its thick coats of clear gloss, the Dworkian Register sits orbited by the chrome rim of its heavy bottom closure. This chrome is picked up in the bases of the four Lucite rods at the top of the machine, each one extending the ultra-bright light of the red hyper-LED housed beneath. These LEDs are envelope pilots, one for each of the four sound banks. With all four banks producing very slowed-down voices, the thick Lucite rods shimmer with red light that animates the Register in a truly startling though enchanting way. Three blue-violet LEDs also glow along; two within frosted glass lenses as power indicators front and back, one hovering above the instrument's images within a side-attached shade.

In pondering the reasoning behind classifying musical instruments by sounding mechanism, or voice system, amidst all the worldwide variance of design there becomes quickly evident a rigid desire for control suggestive of an underlying but overpowering thought system. I wonder then what the result of classifying instruments by thought system would be, and what examples could be looked to as illustration. Maybe Cage's or Partch's adapted or prepared instruments begin to point toward new thought systems, although the apparent desire for traditional control is still strong. But what of the aleatoric, or chance, instrument? Here the musician works with unforeseen spur-of-the-moment changes, allowing the instrument to compose freely while applying controlling factors that often only change the direction of chance elements produced. It is as though the musician startles the instrument which then responds with new discourse. Would this qualify as a new thought system in which to begin to understand a new music? Or new instruments? Not yet? Then what of the chance instrument that operates the other way around... startling the musician instead of the musician startling it?

Across the front panel from the "Create" switch on the Dworkian Register, which applies power to the instrument itself, is the "Confuse" switch. When this switch is flipped, the musician is immediately distracted, thrown off better yet, by what then occurs along the entire front edge of the Register. From within eleven small windows peer out eleven glass animal eyes, all of different species and colors, all now flashing randomly up at the player. Even without dimmed lighting the effect is disconcerting. Enough, hopefully, for the musician to at some point be tripped down a new path, already having become a bit dismayed by the fanciful sound associations springing from the pictures at the fingertips. In this surrealistic scheme of *composer confoundus* there exists a balance between instrument and player that seeks chance as its ultimate fulcrum.

And so I wonder: is it illustrative enough to categorize such an instrument, in the traditional scheme, as simply "electronic"? Or is there yet a "Crazy Wisdom" waiting in the wings?

As music continues to evolve, and holds on high its hallmarks, the minds that create and experience it mature. This fruition of thought will be manifest in such realities as new sound usage, new musician interfaces, new concepts of composition and the needed nomenclature that must result. Yes, the Dworkian Register seems alien in nature... its sounds, its appearance, its curious controls and behavior. But alien, I would guess, in the same way the violin would seem alien to the ancient harp player. Such pondering might place the Register with the violin it could seem, though I suspect it more comfortable with the harp.

John Dwork is the publisher and executive editor of *Dupree's Diamond News*, an internationally distributed rock music magazine. He is widely recognized as one of the world's foremost Grateful Dead scholars. His book, *The Deadhead's Taping Compendium* — a guide to the music of the Grateful Dead on tape, is being published in the spring of 1998 by Owl Books, a division of Henry Holt Publishing. John is also an harmonic overtone singer — able to sing three notes simultaneously. He appears with his overtone choir, Spectral Voices, on the compact disc recording entitled "Coalescence." He is also one of the world's most accomplished "circuit bending" musicians — an esoteric form of electronic music in which musical instruments are manipulated to make ethereal trance music. John is a two-time world flying disc (Frisbee) freestyle champion. He holds the world's only Bachelor of Arts degree awarded for "Professional Flying Disc Entertainment and Education" studies. John is the creative director of Speed of Light Productions, presenter of the world's most visionary multi-media light show Experiences. John is also known as Phun G Badillion, when he serves as the Rabbi of the Phurst Church of Phun (www/phurstchurchofphun.com) — a theatrical/comedic "religion" honoring the spirit of the Holy Phool archetype and practicing the zen art of Crazy Wisdom. John is currently living bi-coastally, splitting his time between Northampton, Massachusetts, and Portland, Oregon.

Contact Reed Ghazala at The Anti-Theory Workshop, c/o Sound Theater, 3325 South Woodmont Ave., Cincinnati, OH 45213, USA; email qrg@antitheory.com.

Reed's full-color Anti-Theory Workshop catalog is now available. A visual treat itself, the eight-panel brochure depicts nineteen different instruments and three of Reed's recent music packages. To receive a copy send $1 and a self-addressed envelope to the workshop address above. For more information, see his notice in this issue's Notices column.

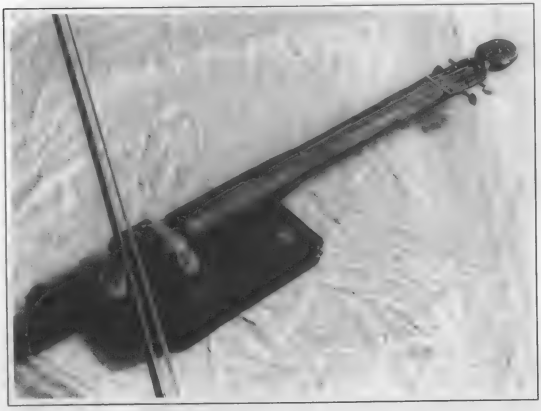
A few years ago, *Experimental Musical Instruments* ran a pair of how-to articles from Steve Ball on the making of electromagnetic pickups. Electromagnetic pickups are transducers of the sort used in electric guitars. Their job is to respond to the motion of a vibrating body within their magnetic field by generating a tiny voltage fluctuation in a wire, which can be sent to an amplifier and speakers in order to create an audible, amplified version of the original vibration. They can work not only with steel guitar strings, but with any vibrating body made of steel or iron. This means that electromagnetic pickups can be suitable, for instance, for steel-keyed kalimba- or marimba-like instruments, not to mention any number of other vibrating body types. Ready-made, commercially produced pickups for guitars and electric basses can be purchased from music stores and guitar maker supply houses for prices ranging from about $25 and up. However, these come in standard guitar or bass size only; if you want a different size or shape you must make your own or order one custom-built.

In the article that follows here, Paul Rubenstein tells how he discovered a world of electromagnetic possibilities, and describes some of his instruments and their custom-designed pickups. For those who might be inspired by the sight of Paul's instruments to do some pickup winding of their own, a few sources of how-to and where-to-get information, including Steve Ball's original *EMI* articles, are listed at the end.

ELECTROMAGNETIC POSSIBILITIES

By Paul Rubenstein

When I first started experimenting with electromagnetic pickups, all I knew about them was that they somehow involved coils and magnets. I had no idea then that that's about all you need to know. I had gone into an electronic surplus store, hoping to find a good deal on a 9-volt adapter for guitar effects pedals when I saw a box marked "coils, 25 cents." Inside were these funky little things wrapped in tape in a steel casing which covered the back, top, and bottom. Two wires protruded from the side. I wondered what would happen if I stuck a magnet on the back, connected the wires to a ¼" jack, and plugged it into my guitar amp. All I had to lose was a quarter, so I took one home and tried it out. I really didn't expect it to work, but when I held it over my guitar and strummed, a very clear, resonant tone came from the amp — at least as good as when the guitar was plugged in, using the pickup it came with.



The Viotar

At this point, light bulbs began going off in my head. My main thought was "what can I do with this information?" I had already built my first home-made instrument, the microtonal guitar, which had movable, "gut" (fishing wire) frets allowing me access to "the notes in-between" to play African, Indonesian, or other scales not possible on an ordinary guitar. I now leave it fretless. I used a regular guitar pickup on it, as there was no reason not to. But special instruments require specialized pickups.

I had always wanted to play a bowed version of an electric guitar, having been inspired at an early age by Jimmy Page's "Dazed and Confused," so my next project was the *viotar*, a four-stringed, electric, bowed instrument with the strings tuned in fourths and a neck the length of a guitar neck. For pickups, I used two of the 25¢ coils with one turned upside-down, to make a humbucker. Turning one upside down causes the current to flow in the opposite direction through its coil (clockwise vs. counterclockwise). The electrical signals now cancel each other out in terms of the property that causes hum, but not in terms of the signal from the strings.

The hardest part in making this instrument was carving the fingerboard, which must be curved for proper intonation. The bridge has to curve to allow the bow access to each string individually, so the fingerboard must also be curved to maintain equal distance from the bridge and the spot on the neck where you are fingering for each string. Otherwise it will sound out of tune when you switch strings.

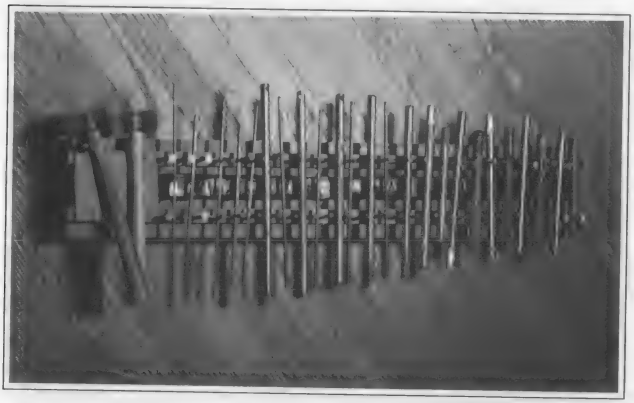
The curvature of the bridge presents a unique problem in

pickup design as well. The pickup also has to "curve" so that each string is about the same distance form the pickup, giving them equal volume. On the viotar, I added some small, powerful rare earth magnets to bring the center of the pickup closer to the middle two strings.

Soon after that, I began studying Javanese gamelan with a group called Gamelan Pacifica here in Seattle, and a friend and experimental instrument maker I met there, Mike Edwards, introduced me to the industrial surplus stores south of downtown Seattle. There I bought ½" diameter steel rods, then rented a rebar cutter and cut rods to specific pitches using an accurate electronic guitar tuner. My first design for the "electric saron," named for a xylophone-like gamelan instrument, had many of those 25¢ coils hooked up in series between two rows of short wooden poles mounted on a wood board. Rubber bands were stretched across the poles to hold the steel rods over the pickups while allowing free vibration when the rods were struck with mallets. This worked pretty well except that all of those pickups hooked up in series created a lot of hum.

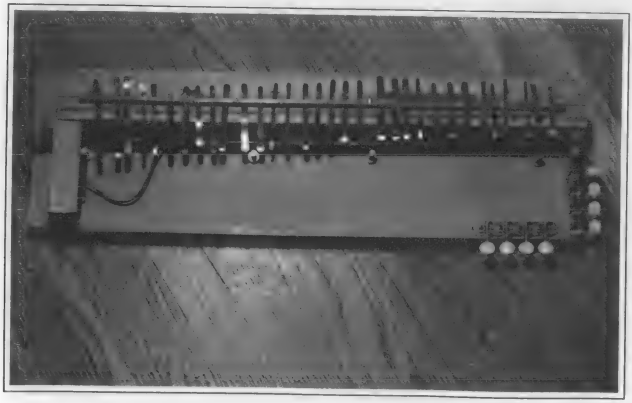
It was at about this time that *EMI* published the first of two articles about pickup-winding [*EMI* Vol. IX #4 and Vol X #1, June and Sept. 1994]. That first article was only an introduction; the second part would contain specific instructions. I couldn't wait that long. I noticed the author, Steve Ball, lived in nearby Bellevue, Washington, so I looked him up in the phone book, called, and we got together and talked pickups. He gave me my first spool of wire and the light bulbs started flashing again (what are we going to do tonight, Brain? The same thing we do every night, Pinky...). I was no longer limited by the size and shape of the surplus coils.

Steve likes to wind the coil around a steel core, and attach magnets separately, as they do in most commercial pickups. I prefer to wrap the wire directly around the magnets. I prefer the tone this gives, and in my experience, the signal to noise ratio is better. I also like to use the strongest possible magnets, as opposed to commercial manufacturers, who use very weak magnets, probably because they're cheaper.



Above: Electric Saron

Below: M'birangi



I soon found that wrapping thousands of windings by hand was tedious work. An old turntable works much better. Once you have it set up, you can walk away and let it go. If you know it's spinning at, say, 45 RPM, it's simple algebra to figure out how long to let it go to accumulate a certain number of windings. An hour to an hour and a half is usually best, depending on the thickness of the wire. I replaced the series of pickups in the electric saron with one over two feet long (the world's largest humbucker?) and it worked much better. Shielding (wrapping it with copper foil) and grounding (connecting a wire to the foil on one end and the ground terminal of your jack on the other) are essential to minimize hum. Copper foil can be found in most hobby shops, and some art supply stores.

Since then, I've come up with various other creations including the *mbirangi*: it has plucked metal tines (spring steel from old clock springs, my Dad's idea) like those on an mbira (aka sanza, kalimba, thumb piano), a two-foot-long pickup, and sympathetic strings that run across the bottom. It's tuned and played like a piano keyboard with 32 keys. It combines ideas from Africa (the tines), Europe (the piano-style set-up), India (sympathetic strings), and America (the pickup).

One of my newest creations is an improvement on the viotar. It has two more (lower) strings, for a total of six. I use flat-wound guitar and bass strings for smooth bowing. The body is a continuation of the neck — i.e., a pole! I used a 1¼" walnut dowel for the neck/body. Starting with an already curved surface was a lot easier than carving one out like I did with the viotar. Making pickups for it was more difficult, though. With no substantial body to it, the

pickups had to be rather small. Carving too far into the dowel to make room for the pickups had the potential to be fatal to the instrument once the pressure from the strings was brought to bear on it. Another difficulty was that with bowed instruments, the strings are set up along a curve to allow the bow access to each string individually. Separate pickups were needed for the set of three lower strings and the set of three higher ones, in order to have equal volume from string to string. Again this meant *small* pickups. Standard wire (42 gauge) is about hair thin, but still builds up too thick after thousands of windings, so I had to try even thinner wire. I used 51 gauge, which is kind of like working with spider webs. When I set up my turntable, it looked like I was spinning the Emperor's new clothes. This stuff is hard to work with, but not impossible, and it's well worth it. The tone is fantastic and even with single-coil pickups, hum is virtually non-existent. As with the viotar, I needed to add some rare earth magnets to get the volume for each string quite right.

The last thing I've made is called the autodrone. It's essentially a two-stringed bass run by a small motor. The motor sits underneath and between the two strings. The motor spins a "propeller" below the strings with a little pick on each end that sticks up and plucks the strings as it goes by, producing a constant drone. The drone isn't static — various harmonics rise and fall for a rich, textured sound. It sounds especially good through a phaser pedal, and I use a steel rod from the electric saron as a slide to change the pitch and get interesting effects, like the sound of an airplane taking off.

The pickup is a basic single coil, except that the wire comes off the spool in a bundle of ten strands, rather than the usual single strand of wire. In theory, ten times fewer windings are necessary to get the same effect as a single wire. In reality, the signal is a bit weaker, but the noise is a lot less. Also, the greater bulk of ten wires together makes it much easier to work with. This stuff is 44 gauge (per strand). Ideally, I'd like to find a spool with ten strands of 51 (the spider web stuff).

I use all of these instruments and others I've made, along with oud, rebab, sitar, and more in a duo called Bakshish. Viren Kamdar plays tablas, durbeke, udu, bata, and other drums from around the world. We play at nightclubs in Seattle, Portland, Eugene, and soon San Francisco, have a CD called *four fifths of the world*, and our music has been used for the book-on-tape version of *Mistress of Spices* published by Bantam books. Our CD is available through our website: bakshish.org, which also features audio and video clips, news about the band, etc. If you have any questions, feel free to contact me at bakshish@speakeasy.org, or write to: Paul Rubenstein, 1401 N. 40th St., Seattle, WA 98103.

BOOKS & ARTICLES

Ball, Steve: "Notes on Pickup Winding and the Quest for Resonance" in *Experimental Musical Instruments* Vol IX #4 (June 1994), and "Electromagnetic Pickup Design and Construction Techniques" in *Experimental Musical Instruments* Vol X #1 (Sept 1994).

The first of these two articles sets the stage and provides inspiration; the second gets down to the step-by-step how-to.

Lollar, Jason: *Basic Pickup Winding and Complete Guide to Making Your Own Pickup Winder.* Published by Lollar Enterprises, PO Box 2450 , Vashon Island, WA 98070; phone (206) 463-9838. 48 pages; cost $18.95.

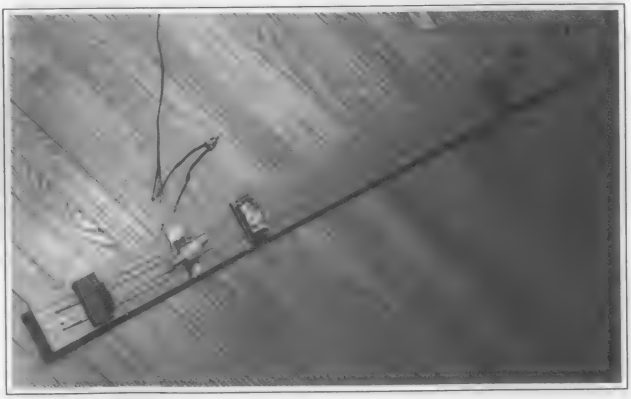
This newly published book provides detailed plans for making a pickup winder (a machine which partially automates the laborious job of winding the wire onto the pickup), taking the reader through the entire process from the construction of the machine to the completion of the pickup.

Brosnac, Donald: *Guitar Electronics for Musicians.* Aamsco Publications. 1988.

Contains detailed designs for pickups and a wealth of related information.

Above: Cellotar

Below: Autodrone



BOOK REVIEWS (with a related recording and video review)

By Bart Hopkin

JASON LOLLAR: **BASIC PICKUP WINDING and COMPLETE GUIDE TO MAKING OUR OWN PICKUP WINDER**

Published by Lollar Enterprises, PO Box 2450, Vashon Island, WA 98070, USA. Paperbound, 8½" x 11", 48 pages, $18.95.

Here's a book about making electromagnetic pickups for musical instruments. These pickups are the sort used in electric guitars. They work by converting the vibratory motion of the strings into an electrical signal that can be sent to an amplifier and speakers. More generally, since their operation is based on magnetic effects, they can be used on any instrument in which the vibrating body, like an electric guitar string, is made of ferrous metal (iron or steel). The essential elements in an electromagnetic pickup are a bar magnet and a coil of copper wire. For best effect, the coil should have many windings of extremely fine wire — hundreds or thousands of loops wound upon one another. For this reason, the biggest chore in pickup making is the time-consuming and very delicate task of winding the coil. Commercial manufacturers have custom-designed machines for this purpose, while individuals who home-build their own pickups typically do the winding by hand.

Now there's another option. Jason Lollar's *Basic Pickup Winding and Complete Guide to Making Your Own Pickup Winder* presents plans for the design and construction of a pickup winding machine. The machine is home-buildable with commonly available materials, including a motor recycled from an old sewing machine. The plans are fully detailed, and extensively illustrated with both photographs and diagrams. Also included is a list of suppliers, a list of related publications, and a glossary.

Lollar describes the pickup-making process, but most of this information is brief — his chief emphasis, instead, is the making of the machine. This was a sensible decision: there are several resources that discuss the process of pickup making, including those listed in Lollar's publications list as well as Steve Ball's articles on the subject in the June and Sept 1994 issues of *EMI* (Vol. IX #4 and X #1; particularly the latter). But Jason Lollar's pickup winding book is alone and unique in providing plans for the winding machine.

HARVEY RUDOFF: **THE PRACTICALLY COMPLETE GUIDE TO ALMOST REAL MUSICAL INSTRUMENTS FOR NEARLY EVERYONE**

Lerner Publications Company, Minneapolis, MN, 1964. 32 pages, hardbound.

Some years ago Edward Gonzo, an especially generous *EMI* reader, gave me this book to add to *EMI*'s library of essential resources in the fields of organology and acoustics. It has ever since lain on desks and coffee tables, sat on bookshelves, and rested in a cardboard box labeled "maybe to review someday". Of course, it's not really suitable for review, because it was published thirty-five years ago and is in all probability long out of print and no longer available. That must be why I'm reviewing it now.

The Practically Complete Guide to Almost Real Musical Instruments for Nearly Everyone is a collection of short, humorous poems about fanciful musical instruments sprung from the imagination of Harvey Rudoff, a junior high school band teacher who lived, at the time of the book's creation, in Denver. The lurk, the groanette, the double honk, the snaxophone, the bofflebone and a dozen or so more are immortalized here not only in meter and rhyme, but as well in Rudoff's simple, hand-carved linoleum-block prints.

This is the junior high music experience that we all should have had: a band class full of experimusical mental instruments! Rather than saying more on a subject that speaks better for itself, I'll assue that the publisher won't mind my playing a little loose with the copyright laws, and close with Harvey Rudoff's description of one of the pieces from his instrumentarium:

> There are seven tires
> On the Six-Wheeled Furble
> But there's a reason for that.
> The extra one's there
> For use as a spare,
> Just in case of A♭.

ANONYMOUS: **THE ANONYMOUS FAMILY REUNION**

Book and video from Anonymous, 1309 Melwood Ave., Pittsburgh, PA 15213, USA. Price $25.

VOLUNTEERS COLLECTIVE: **THE ANONYMOUS FAMILY REUNION**

Cassette from Widemouth Tapes, 3809 Melwood Ave, Pittsburgh, PA 15213, USA

In the issues leading up to summer 1997, notices appeared in *EMI* announcing an Anonymous Family Reunion — a proposed gathering of people who have at one time or another chosen to be anonymous. The plans for the reunion provided for activities involving unusual found and invented instruments, including music-making trips to Pennsylvania's Ringing Rocks State Park and to the studio in which reside the late Harry Bertoia's unique sound sculptures, as well as those of son Val Bertoia.

The event took place as planned on the weekend of August 29-31. Documentation of the event has now appeared, and it comes in the form of a book-and-video combination, plus a separate audio cassette tape.

The book/video portion has a Siamese-twins format: a staple-bound book of 132 pages physically joined at the back to the plastic case that holds the video. The book pages are cut squiggly at the edges, each page squiggled differently so that they don't line up together, and the pages, which don't stay shut but tend to fan out half-open, are all different colors, tending toward lime greens, pinks and pastel purples.

The book and video were created by Anonymous, the event's organizer. As with all else that comes from this particualr Anonymous, this is a rare and completely unique document. It's personal, frank, devoid of sheen or show or pretense; it's funny, depressing, moving, irritating. Much of the text is made up of reproductions of correspondence involved in the planning of the event, with connective narrative and commentary from Anonymous. With the continuing narrative we eventually get to the event

itself, learning how it survived several minor disasters and a major one. The text winds down at the end with after-the-fact correspondence and reflections. It's seemingly prosaic material — the paper trail left by the event preparations — but it makes intriguing reading because somehow within the exchanges of email messages and postcards, human personalities lie half-concealed and oddly, often unflatteringly, revealed.

The video starts with scenes shot at Ringing Rocks, featuring several anons sounding the rocks with hammers, and playing a few other instruments as well. The video tape's sound reproduction is not the greatest, nor is the image quality, but you do get a sense of the clear, ringing tone that the best of the big boulders produce. Later the scene moves to the Bertoia studios. Here, again despite imperfect reproduction quality, the viewer can get a sense of the look and sound of Harry Bertoia's remarkable instruments, with their swaying forests of clanging and sizzling upright metal rods, and the impressive booming of giant gongs.

The separate cassette is labeled on one side "Saturday, August 30, 1997," presenting sounds recorded during the first day of the reunion, including three segments from Ringing Rocks and two from the Sonambient Theater (the Bertoia studio). The second side is "Sunday August 31, 1997," and it contains longer segments recorded among the Bertoia instruments. I find the Sunday recordings particularly effective. The cassette, on side two at least, has decent sound quality, and you can get a wonderful sense of the instrument's sounds. A sustained ebb and flow of Bertoian sizzle underlies most of the side — a beautiful, shifting metallic spectrum. Over this rises a variety of contrasting sounds. The giant gongs thunder and then are silent; a mix of other instruments, including several brought from elsewhere by various anons, stand as color-patches in relief. My appreciation goes to this ad hoc group for their good listening/sounding of the instruments.

NOTICES

WANTED: Unusual musical instrument acts to be featured in an upcoming motion picture. Must be unique & visually appealing, from 3 to 5 minutes long. Could be funny, weird or outrageous, and preferably have a climax payoff. Contact Larry Wright, 15382 Andaman Ln., Huntington Beach, CA 92649. [13-4]

ANNOUNCING THE RELEASE OF BOOK AND CD: *Wisdom of the Impulse: On the Nature of Musical Free Improvisation*, a new book by Tom Nunn, and *Peering Over*: The Edgewater Experimental Instruments Consort, a new CD featuring 15 of Nunn's instruments with 15 players in live performance. $30 + $5 shipping for the book; $10 + $2 shipping for the CD. Payable to Tom Nunn, 3016 25th St., San Francisco, CA 94110. [13-4]

Stockholm, Hey Listen! is an international conference on acoustic ecology organized by the Royal Swedish Academy of Music in partnership with the World Forum for Acoustic Ecology, set to take place June 9-14, 1998 in Stockholm, Sweden. The conference will focus on the use and abuse of sounds, the design of artificial sound, and the theme "From Awareness to Action." All conference proceedings will be in English. For more information, email h.karlsson@musakad.se, or on the web visit http://interact.uoregon.edu/MediaLit/FC/WFAEsc.html. [13-2]

The 1998 meeting of the International Symposium on Musical Acoustics will be held June 26 - July 1 in the Cascade Mountains outside of Seattle, Washington, jointly sponsored by the Catgut Acoustical Society and the Acoustical Society of America. For more information visit the ISMA Home Page at http://www.boystown.org/isma98/ or fax (201) 744-4029. [13-2]

RESEARCHING "ONE MAN BANDS." Mandolinist/journalist Niles Hokkanen is researching the subject of "one man bands" and musicians who perform on 2 or more instruments simultaneously. Niles would like to talk to these types of musicians about their setups, how they solved physical multi-instrumental dilemmas, why they began performing multiple musical functions, and the mental learning processes involved. Photos, recordings (commercial or cassette demos), etc. can be sent to Niles Hokkanen, PO Box 3585, Winchester, VA 22604; phone (540) 722-9429; email mandoman@monumental.com (Niles who is a notable mandolinist, also plays midi-bass pedals and foot percussion/drum-kit and has constructed portions of his own gear.) [13-2]

The World Shakuhachi Festival 1998 is will take place July 5 – July 10, 1998 at the College of Music, University of Colorado, in Boulder. For information, contact Christopher Yohmei Blasdel, email kokopelli@inJapan.net; or Monty Levenson, Tei Hei Shakuhachi, PO Box 294, Willits CA 95490 USA, email monty@pacific.net; web site http://www.pacific.net/~shakuhachi. [13-2]

Bears Beat Bowls in the Bathtub, a new book/tape/guide set for children by Kathy Teck, illus. Roy Doty. Narrated by Geoffrey Holder; original music by the Hit-It Band using homemade instruments. $19.95 plus $2.84 shipping (NYS residents add sales tax). Hit-It-Kits, PO Box 139 Gedney Station, White Plains NY 10605.[13-1]

THE TACTUS PRESS. Theremin and historic percussion publications. Write for catalog: The Tactus Press, Dept. EX, PO Box 9704, Austin, TX 78766-9704. (512) 453-7779; email bobs@ccsi.com.[13-1]

Seeking information: If you have information about bamboo saxes, or other sorts of unusual sax-like instruments, builders, history, references, anywhere in the world, please contact Ángel Sampedro del Río, Scalabrini Ortiz 1960, Villa Adelina (1607), Buenos Aires, Argentina, fax [international code, plus] 541-794-3880.[13-1]

Bamboo Stamping Drums from traditional bamboo for this purpose – Schiziostachyum glaucifolium –light, straight, thin wall, strong. 3 sizes. Comes in pairs. sml 18-24 in. = $35. med. 2-3 ft = $50. large = $90. Smoked and oiled and bound. Comes with pads and information. pack and ship air/priority in U.S. = + 15%. Richard Waters, PO Box 1071, Pahoa, HI 96778.[13-1]

EXPERIMENTAL AND ELECTROACOUSTIC RECORDINGS FOR SALE. Many unusual titles, such as Harry Bertoia, etc. LPs a specialty. Send for free listing to: SONIC TIGER MUSIC, PO Box 715, Cambridge, MA 02140 USA; email stmusic@shore.net. [13-1]

ORDER THE MUSIC OF THE GRAVIKORD, Bob Grawi's electric double harp based on the African Kora (featured in EMI, April 1988, and Bart Hopkin's new book *Gravikords, Whirlies and Pyrophones*). Cassette tapes $10; CDs $15 (+1.50 s&h) to White Bear Enterprises, PO Box 106, Florida NY 10921; 914/651-2327.[12-3]

Earthshaking Music '97 "World Music Source" is now available (Free!). 400+ cds, books, videos & cassettes. Instruments from everywhere! Submissions of research papers, videos, recordings, instruments, etc welcomed for inclusion in our catalog. Email to erthshkn@avana.net or call (404)622-0707. [12-3]

Reed Ghazala's **Anti-Theory Workshop** is now offering circuit-bent Incantors, Trigons, Photon Clarinets, Morphiums, Aleatrons, one-of-a-kinds, CDs and collected writings. For Reed's full-color, visually stunning brochure/catalog/fractal artwork depicting 18 instruments, CDs, friendly raccoons and more, please send $1 (or any interesting tidbit of your choice) to: Reed Ghazala c/o **The Anti-Theory Workshop**, Sound Theater, 3325 South Woodmont Ave. Cinti., OH 45213. Present web: http://www.iac.net:80/~cage/reed.html. Coming soon: http://www.anti-theory.com E-mail: qrg@anti-theory.com [12-3]

GRAVIKORDS, WHIRLIES AND PYROPHONES -- book-and-CD boxed set from *Experimental Musical Instruments*, produced in conjunction with the publishing company Ellipsis Arts. A book-and-CD combination devoted to new and unusual musical instruments from some of the world's most interesting and inventive instrument makers. Informative text, wonderful photographs and great recordings. Every track of the CD and page of the book overflow with the ideas and the originality of the featured builders. 37 musical instrument makers appear in the book, with music from 18 of them included in the CD. Price $29.95 for the book and CD (no shipping charges for U.S. air mail or overseas surface rate; add 25% for overseas air; California residents only at 7.25% sales tax), available from EMI at PO Box 784, Nicasio, CA 94946, USA; phone/fax (415) 662-2182; e-mail EMI@windworld.com Visa & Mastercard accepted. [12-3]

Musical Instrument Design: Information for Instrument Making, by Bart Hopkin, editor of *Experimental Musical Instruments*, published by See Sharp Press. *Musical Instrument Design* presents underlying principles for the design and construction of acoustic musical instruments of all sorts, with a practical, hands-on approach. No other book gathers this information under one cover. Just under 200 pages long; large format; fully illustrated. $18.95 plus $2 s&h. (This covers shipping charges for U.S. air mail or overseas surface rate; for overseas air add another 25%. Customers in California add 7.25% sales tax.). Order from *Experimental Musical Instruments*, PO Box 784, Nicasio, CA 94946, USA, phone/fax (415) 662-2182. [11-4]

The EMI Wall Chart is a beautiful 24"w x 36"h wall poster, with graphic design by Gwendolyn Jones, covered with practical reference information relating to musical instruments and instrument making. Suitable for the workshop or living room. Some of the material on the chart replicates material in the *Musical Instrument Design* book (see previous ad), but since the wall chart format has its own advantages, you might be happy to have both. The price is $12. (No shipping charges for air mail within the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax.) Order through *Experimental Musical Instruments*. [11-4]

Making Simple Musical Instruments: A Melodious Collection of Strings, Winds, Drums & More — A book by Bart Hopkin, editor of *Experimental Musical Instruments*, published by Lark Books. It is a collection of plans for home-buildable musical instruments, ranging in difficulty from simple to moderate. The book is written for a general, non-specialist audience, and the approach is non-technical. The instruments aren't so very far out: most of them relate to familiar instrument types and are playable as such. Yet even experienced experimenters will find some new ideas here. It's hardbound, with 144 big and very full pages, lots of color, beautiful photos & illustrations; price $24.95 plus $2 s&h. (This covers air mail within the U.S. or overseas surface rate; for overseas air add 25%. Customers in California add 7.25% sales tax.) Order from Experimental Musical Instruments, PO Box 784, Nicasio, CA 94946, USA, phone (415) 662-2182; email EMI@windworld.com. Visa/MC accepted.

Air Columns and Toneholes: Principles of Wind Instrument Design is a spiral-bound booklet containing the four articles on practical wind instrument acoustics by Bart Hopkin that appeared in EMI in 1992 and 1993. The articles have been revised and improved, and there are several additional features included. Published by Tai Hei Shakuhachi; available for $14.00. (This covers air mail shipping within

the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax). Order from EMI, Box 784, Nicasio, CA 94946. Visa/MC ok.

DISPLAY ADS IN EMI are more affordable than you might think. $60/half page, $40/quarter page, $25/eighth page. If you have a product or service that you'd like to promote just a bit more conspicuously, call or write for details: EMI PO Box 784, Nicasio, CA 94946; phone/fax 415/662-2182.

SUBSCRIPTIONS TO EMI: $24/yr for U.S.; $27/yr for Canada & Mexico; $34/yr overseas. Order from EMI, Box 784, Nicasio, CA 94946, USA. Visa/MC accepted.

EMI BACK ISSUES: Bound volume sets Vol 1 through Vol. 12: $17 per volume. Each volume set contains all of the issues of one volume year, photocopied and bound under one cover. The photocopies are a step down in quality from the original press runs, but they are decent as photocopies go, and they are fully readable. Individual back issues from Volume 13 and later are available in the original press run at $6 each. These prices cover air mail shipping within the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax. Visa and MasterCard accepted. Order from EMI, PO Box 784, Nicasio, CA 94946, phone/fax (415)662-2182, email emi@windworld.com, or write for a listing of back issues and their contents. Corresponding cassette tapes are available for later volumes; see information below.

CASSETTE TAPES FROM EMI: Each cassette in the EMI cassette series contains music of instruments that appeared in the newsletter during the corresponding volume year, comprising a full measure of odd, provocative, funny and beautiful music. Volumes 6, 8, 9, 10 11 and 12 are available. (Vols 1 - 5 and 7 are now sold out). The price is $8 per cassette. No additional ship delivery in the U.S. or surface delivery overseas. For overseas air add 25%; in California add 7.25% sales tax. Order from EMI, Box 784, Nicasio, CA 94946. Visa and Mastercard accepted.

Recent Articles in Other Periodicals

The following is a list of selected articles relating to musical instruments which have appeared recently in other publications.

"Steve Turre: Rhythm Within" by Jerry D'Souza, in *Coda Magazine* issue 227; Jan 1998 (Box 1002 Stn. 0, Toronto, Ontario, Canada M4A 2N4).

An article on jazz trombonist Steve Turre, much of it devoted to Turre's work with conch shells, played solo and in conch shell ensembles.

"Electronenmusik" by Von Klaus-Dieter Linsmeier, in *Spectrum der Wissenschaft* December 1997 (Vangerowstrasse 22, D-69115 Heidelberg, Germany).

A history of electronic music, with text on and photographs of early pioneers and inventors as well as contemporary artists. [In German]

"Played by my Instruments" by Johannes Bergmark, in *Rubberneck* 26, Dec 1997 (c/o 21 Denham Dr., Basingstoke, Hampshire, RG22 6LT, England).

Johannes Bergmark describes his many, varied and wildly imaginative instruments, and describes how the forms of the instruments influence his musical ideas and output.

"Heavenly Music" by Michael Valenti, in *Mechanical Engineering*, April 1998.

A report on a "Keplerian Harp" which was exhibited at the Third Symposium for the Visual Arts in Amos, Quebec, July 1997. The harp is a MIDI device which maps readings taken from changing patterns in the cloud cover into patterns of musical sound.

"Music of Sound and Light" by Maria Anna Harley, in *Leonardo* Vol 31 #1, 1998 (MIT Press, 5 Cambridge Center, Cambridge, MA 02142-1493)

A discussion of the intersection of musical and architectural ideas in the work of Iannis Xenakis. The author discusses the Philips Pavilion described in Ray Wilding-White's article in *EMI* Vol 13 #3, as well as several of the composer's later works in sound, light and architectural structure.

"The Eskimo Drums of Alaska" by Scott Deal, in *Percussive Notes* Vol. 36 #1, February 1998 (PO Box 25, Lawton, OK 73502).

A report on Eskimo frame drums, with an emphasis on surrounding lore and cultural context, as well as playing technique and the instruments themselves.

"Le Chemin du Djembe" by F. Kokelaere & N. Saïdani, in *Percussions* No. 54, Nov/Dec 1997 (18, rue Théodore-Rousseau, F-77930 Chailly-en-Bierre, France).

A report on the djembe drum of West Africa.

American Lutherie #52, Winter 1997 (8222 South Park Ave., Tacoma, WA 98408-5226) presents its usual complement of articles on guitars and other string instruments, including a report on the 1997 Healdsburg Guitar Festival with photos of many beautiful and unusual guitars.

Noise Gate 6, 1997 (phone in UK 0114-2432766) has several articles to note:

"The Perception of Space in Music — Part 2" by Peter Lennox is a discussion of the role of spatiality in the aesthetic effect of sound and music, including thoughts on the spatial qualities of every-day music and as well as ideas about how music with a specifically spatial orientation can be realized.

"Singing Kites: Noise on a String" by Paddy Collins reports briefly on different types of sound kites, with a bit of historical perspective.

"ActionConcret: Art, Sound, Research" by B.G. Nichols describes efforts by the author to bring art, sound and science together in projects involving sculpture and sound in interaction. The emphasis is on systems in which sound generates sculpture, such as Chladni patterns and more sophisticated variations thereof.

FoMRHI Quarterly #89, October 1997 (171 Iffley Rd., Oxford OX4 1EL, UK) contains the following articles (and more):

"Hardening and Tempering Tool Steel" by Rod Jenkins: Practical information with application for instrument makers working with metals.

"Recorder Voicing" by Alec V. Loretto: More practical information, this time for makers of fippled woodwinds.

"What happens when and after the clavichord tangent hits the string?" by Ephraim Segerman: a detailed look at the physical behavior of clavichord strings.

"The purpose of the cotton between the hurdy-gurdy wheel and the string," also by Ephraim Segerman: just a couple of paragraphs about the mechanics of the stick-slip vibration in hurdy gurdies.